The Potential of Digital Games for Empowerment and Social Inclusion of Groups at Risk of Social and Economic Exclusion

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The Potential of Digital Games for Empowerment and Social Inclusion of Groups at Risk of Social and Economic Exclusion: Evidence and Opportunity for Policy

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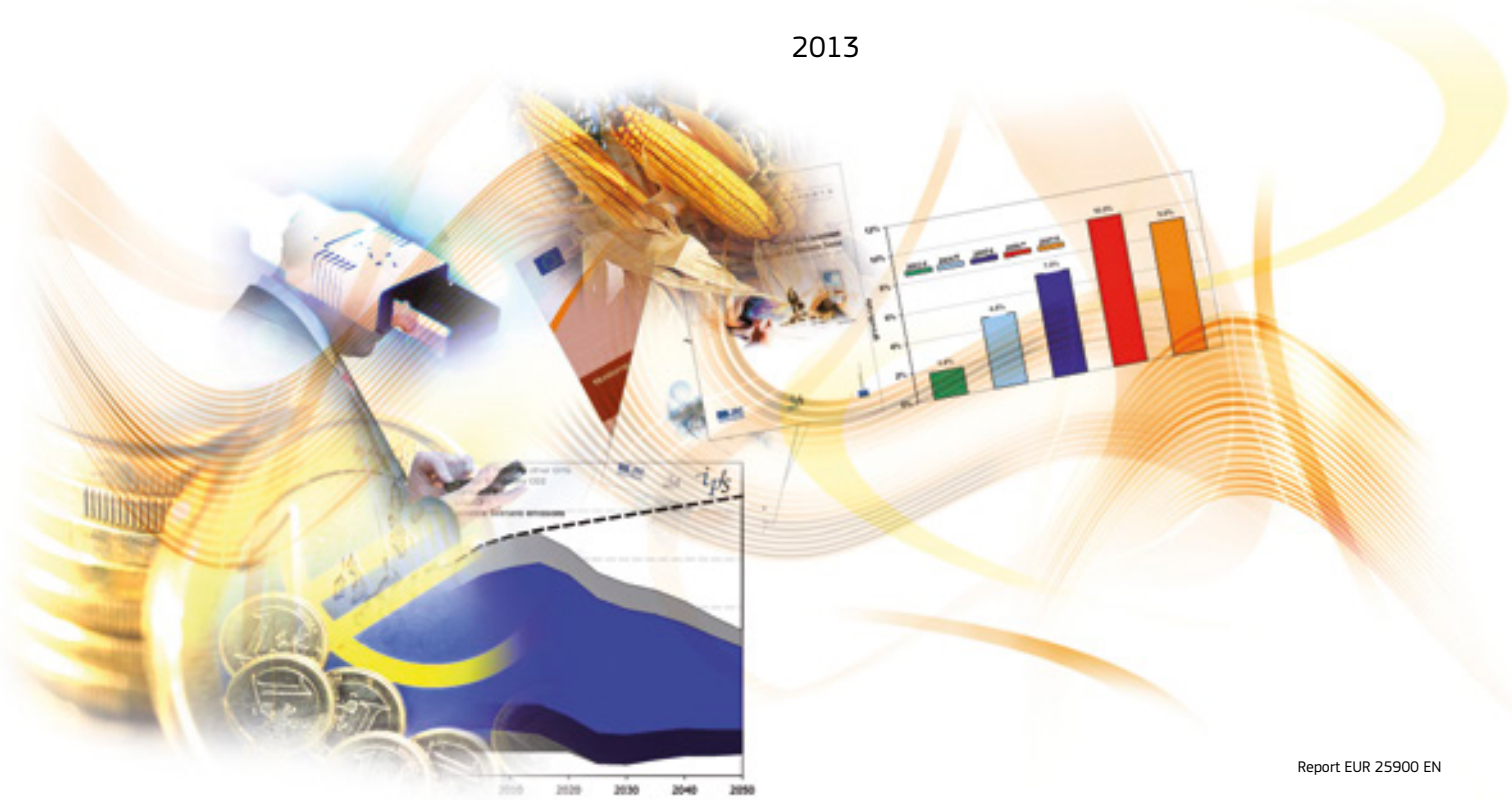

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Although these contributions were substantial, the responsibility of this final version clearly remains with the authors.

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1 12-13 July 2012 in Bilbao (Spain) http://www.euclidnetwork.eu/projects/current-projects/research-projects/emergency-by-design-md/active-learning-seminar.html

2 http://asc-inclusion.eu/?page_id=664

Preface

In Europe today an estimated 110 million people are at risk of social exclusion. This presents society, entrepreneurs and policy makers with a challenge that calls for social innovation of all types to tackle unemployment, low skills, discrimination, barriers to disabled people, poor health and other factors associated with social exclusion and poverty.

The Information Society Unit at the JRC IPTS leads research to explore and show when and how information, communication and media technologies can shape the conditions of social exclusion, and offer pathways to social inclusion, particularly when used by social inclusion actors and intermediaries. Previous research has demonstrated how 'conventional' technologies such as the PC and internet applications can support socio-economic inclusion processes for populations at risk of exclusion such as migrants, youth at risk, and the elderly and their carers. In recent years there has been growth of research and commercial activity in the use of digital games for non-leisure activities and the promise of gamification as a building block of social innovation promoted DG CNCT and the JRC-IPTS to launch a study, *Digital Games for Empowerment and Inclusion (DGEI).* The goal has been to better understand how this hugely popular media form is being applied to issues of concern for social inclusion policy, and to inform future policy options. .

The main output of the study is this JRC Scientific and Policy report, which brings together and analyses the contributions of the many people who lent their expertise to this research in 2013. It is accompanied by two JRC technical reports, *"The State of Play of Digital Games for Empowerment and Inclusion: Analysis of Literature and Empirical Cases*" which presents a detailed literature review of the current state of research knowledge and original empirical research practice, and '*The industry and policy context for DGEI: market analysis, future prospects and key challenges in videogames, serious games and gamification*' which provides background on the videogame industry and serous game industry for policy makers interested in understanding the state of play of these industries, their relationship, and exisiting policy activities in relation to digital games as a whole.

It is hoped that this report will support policy makers with responsibilities in employment, youth and social policy, health policy, education policy, technology policy and industry policy to work together with other stakeholders from practice, research and industry in taking decisions about how to exploit the exciting potential of digital game-based approaches in meeting social and economic goals.

Other DGEI reports

This report is accompanied by a number of other reports and project deliverables available from the JRC-IPTS:

The State of Play of Digital Games for Empowerment and Inclusion: Analysis of Literature and Empirical Cases, Authors: Bleumers, L., All, A., Mariën, I., Schurmans, D., Van Looy, J., Jacobs, A., Willaert, K., & De Grove, F.. Editor, James Stewart, Scientific and Policy Report by the Joint Research Centre of the European Commission

The industry and policy context for DGEI: market analysis, future prospects and key challenges in videogames, serious games and gamification Authors: Stewart, J and Misuraca, G. Scientific and Policy Report by the Joint Research Centre of the European Commission

DGEI Project Deliverable D1 Annex 3 **Multi-initiative and policy-focused cases of the support for and use of Digital Games for Empowerment and Inclusion,** Editor: Stewart, J.

DGEI Project Deliverable D1 Annex 4: **EC and Other European institution activities related to digital games and DGEI,** Editor: Stewart, J.

DGEI Project Deliverable D3 **A Roadmap for Action on Digital Games for Empowerment and Inclusion in Europe.** Authors and Editors: Stewart J., Misuraca G.

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Executive Summary

This report addresses the potential of digital games to support social inclusion and empowerment goals. It is based on a range of theoretical and empirical data, brought together for the first time in this and associated reports. The aim of the report, commissioned by DG CNECT, is to provide a better understanding of the industrial, market, social opportunities and limitations of digital games for empowerment and as a tool for socio-economic inclusion of people at risk of exclusion (such as youth at risk, migrants, elderly people, the unemployed, and the low-educated). A review of the literature, 12 original short case studies, a number of workshops, and contributions from experts and stakeholders were used to identify both policy opportunities and challenges for deployment of digital games and gaming for social inclusion and empowerment.

The use of digital games and gaming is starting to show **potential in addressing issues of policy concern** including wellness and aging, education and employability of poor learners, improved quality of training and skill development in industry, and civic participation. The development of an industry providing services and products is also promising in terms of growth, and in improving the effectiveness of public services and interventions by third sector intermediaries to enable social inclusion. In terms of European policy, this could contribute to some of the main goals of Europe 2020: employment opportunities, educational achievement, and reduction of poverty and social exclusion. It is relevant to five of the major flagship policies: Youth on the Move, the Digital Agenda for Europe, the Agenda for New Skills and Jobs, the European Platform against Poverty and Social Exclusion, and the Innovation Union, (with the potential for growth in the emerging market for 'serious games'). There are also issues of concern that must be taken into account by media regulation, media and cultural policy, policy to facilitate economic development through the creative and cultural industries, and the Single Market.

Opportunities

The research literature and case studies explored in this report (Chapter 2) shows that digital games-based approaches provide adaptable, motivating and engaging techniques that can be used to empower individuals and communities in ways that lead to social inclusion. However this evidence is still fragmentary. A review of practice shows that digital game approaches are being used, and offer particular promise, as they can:

- Support disengaged and disadvantaged learners and enhance employability and integration into society: e.g. games that help people with learning disabilities, or games that facilitate low-level training and reinsertion into education. This is the area with the greatest activity, and is focused primarily on young people.
- Promote health and well-being: e.g. games which aim to raise awareness about certain physical and mental health issues, promote health and well-being either as part of prevention, or in support of those who are dealing with health problems. This area covers all age groups and a wide range of people, from children in hospital, those following specific diets and fitness routines, to patients in rehabilitation from mental illness, and 'active aging' of older people.
- Foster civic participation and community-building: e.g. games which raise awareness about political and governmental topics, or enable participatory community planning. Work in this area, where games have been identified as a powerful communication tool. is often focused on young people. However, the qualities of games are being used for all age groups, and in the developed and the developing world.

Digital game-based approaches include the use of commercial entertainment games, special-purpose games, and by co-creative game-making, and application of game-techniques in non-game contexts, or 'gamification'. **They work by facilitating learning and participation in multiple ways**, not merely conveying declarative knowledge, but also developing systems thinking skills, creativity, social skills and other '21st Century' skills such as online collaboration and creative thinking. Seven different processes can be identified for how games do this, such as increasing engagement in learning, supporting experiential and social learning, creative and personalised learning, and a safe environment for experimentation.

Outcomes of using the game-based approaches identified in this report include building social ties and participating in communities of practice around gaming; developing **core skills** such as literacy and maths, and **specialised skills** in technology and design; **personal empowerment** though improved self-confidence and self-efficacy; and increasing

awareness among particular groups of important issues such as discrimination. These outcomes are all fundamental to facilitating active empowerment and inclusion, whether it be **preparing for employment, keeping active in old age or enhancing civic participation.** Digital games can be used with many target groups, ranging from children from deprived communities, young people not in Employment, Education or Training **(NEETs),** disabled people, the acutely and chronically ill (both mentally and physically), elderly people suffering isolation, people in communities with high crime rates or problems of extremism and social entrepreneurs. Nonetheless, this report finds that **games-based approaches offer a particular opportunity to reach young people at risk** – especially the 'NEETs'.

The role of professionals and intermediaries

Rather than seeing digital games as replacements for other interventions, or for use in isolation, this report focuses on their potential for **empowering intermediaries and professionals** who work in the domain of social inclusion. Digital game approaches can be applied in many areas of **social inclusion work**, such as **combating school and training dropout**, **coping with chronic illness** and helping **migrant integration**. When given the appropriate assistance, professionals such as teachers and medical professionals readily see the potential of digital games. Where internet or mobile access and skills are available, **digital games can be distributed at low cost and used online, reaching an unlimited audience.** They can be designed to be customisable, bringing benefits of both broad reach and local adaptation. Digital game techniques can be used in formal contexts, like health services and schools, but may be particularly suited to the context of much social inclusion initiatives promoted by among third-sector intermediary organisations, where informal and non-formal learning and support techniques are used.

Social inclusion is a difficult field, so the application of digital games is **complex and sensitive process**. The socially excluded often suffer multiple deprivations, and live in communities with many problems and few resources**. Interventions with the socially excluded are often poorly resourced** and intermediary organisations, professionals and decision makers are under pressure. This makes the adoption of novel approaches like digital gaming difficult and creates **barriers** to both **effective innovation** involving developers, intermediaries and users, and the emergence of stable practices and markets. Nonetheless, innovation is occurring, and novel ideas are becoming new practices which can achieve real impact. However, further research and implementation is needed to understand how digital games and gaming can be used effectively and cost-effectively in a range of settings, how to encourage intermediaries to use games, and what role professional games designers and researcher can play in creating new products and techniques.

Opportunities to exploit gaming culture and reuse game technology

The potential of digital games is in part based on the widespread adoption and use of digital games in 21st century. Digital game audiences are expanding rapidly**: gaming is almost ubiquitous among young people and is reaching older age groups, with social, casual and intense forms of gaming appealing to women and men alike**. New devices, such as smart phones and tablets, and new ways to play games, particular online, are changing the face of gaming (Chapter 3). The digital game industry, currently worth over €56 billion globally, continues to grow fast, playing a leading role in the development of interactive, mobile and online media products, services and business models, and in the growth of ICT-based consumer business. Investment and innovation in the games industry is also spilling over into other industry segments, like science, defence, media and education, making it a driver of growth in more sectors than just the entertainment video games sector.

The use of digital games for social inclusion and empowerment is part of a larger **trend emerging over the last 10 years towards the use of digital game techniques, technologies and products in a range of non-leisure sectors** including health, education, training, defence, communication, advertising and activism. Growth in this market demonstrates the value of digital games for 'serious' purposes. Investors, researchers, practitioners and policy makers are starting to identify opportunities for a **'serious games' and gamification industry**, supplying a market currently estimated at over €2.35 billion worldwide, predominantly in the USA, but reaching €500m in Europe. New tools and platforms make games development ever more accessible to both professionals and end users. Moreover, the internet and mobile platforms make distribution cheap and simple – the basis for a growth market. Digital games design offers young people **new and attractive education and career paths,** not only in games development, but in a whole range of other fields of work. National policy makers, notably in the USA, are focusing on the economic and social opportunities of digital games, promoting the use of digital games in education, government, and raising the visibility and legitimacy of digital gaming. Other countries, including France, Singapore and Korea have investment programmes in serious games with the aim of stimulating industrial growth and social outcomes. The Euopean Commission has also invested significantly in a range of R&D and implementation projects, particularly related to education, but without a clear high-level policy vision joining up the initiatives that exist across DGs. The potential for DGEI goes far beyond what is available today, but will only reach this potential of a number of challenges are overcome.

Challenges

Despite these promising activity and opportunities, the idea that digital games can be used as a resource for empowerment and social inclusion is relatively new and not well known. In addition, there are **important barriers and challenges** that stakeholders must address (Chapter 4). The nascent 'serious game industry' is still fragile and ill defined, with shifting business models and limited government assistance. In fact, it is not yet established if there is such as thing as a 'serous game' industry at all. While digital games are gaining markets in areas such as advertising and corporate training, it is still unclear what business models and gains in effectiveness and efficiency in other application domains could ensure the development and use of digital games for empowerment and inclusion.

Barriers to adoption among users make the innovation and business development process slow and risky. **Low awareness and negative images** of digital games constitute major barriers to investment and adoption. Changing institutional and professional practice in education, social care and health care to make the best use of ideas, techniques and products of digital gaming can be **held up by slow and uncertain systemic change**.

Other barriers to exploiting games are **the low quality** of many special-purpose games, **lack of formal evidence of impact** and the scarcity of high-profile demonstrations. Networks of practice and financial and knowledge assistance are only just being put in place to allow the build up of knowledge and experience among developers, professionals, researchers and educators. There is a great deal of anecdotal evidence, but the scientific evaluation and impact assessment literature, although positive, is rather minimal. Considerable work is still needed to convincingly demonstrate the potential impact of digital games and gaming on social inclusion and empowerment. In addition, appropriate assessment techniques must be found to judge outcomes.

Finally, **successful innovation needs investors, entrepreneurs, users, intermediaries, researchers and game developers** who can produce high quality products and services. These must be delivered sustainably and reach a wider constituency of users than just partners in individual projects. The mainstream game industry, and game design professionals are still reluctant to work and develop markets in the 'serious' side of digital gaming. Millions of euros and dollars have been spent on research and pilots, but this is not translating into widespread use, and many practitioners remain to be convinced. Funded research projects fail to adequately address issues of implementation and the challenges of real-life experimentation and sustainability, and are often unable to address the systemic barriers such as procurement and quality control in application domains. However, this sustainability will not come from individual efforts, but rather from the development of an ecosystem of production and applied use of digital games in general.

The policy perspective

To build this ecosystem and to reap the benefits of use of digital games the participation of policy is crucial, partly because social inclusion activities are largely shaped and funded by the state, and partly because the challenges indentified in this study indicate that the coordination needed between research, application and industry is a role in which policy makers have instruments with which they can contribute. The opportunities for public policy can been identified in the following areas:

- Employment and growth can be stimulated by attracting, rewarding and sustaining innovation in the digital gaming field in general, and the 'serious game' field in particular;
- Social cohesion and individual and community empowerment can be supported through the availability and use of appropriate digital game-based practices and products; and;
- Effective provision of services meeting public policy goals, such as education, health and social welfare can be facilitated by adopting digital-game based practices.

To exploit these opportunities, future development in the field could be supported by policy that would:

- Develop sustainable practice in application domains, including many areas directly related to social health and economic policy. Front line intermediaries require both practical assistance measures and leadership from decision makers and policy, and policy actions to structural and institutional barriers that shape their ability to use games. This will create demand for products and services.
- Develop the supply of services, products, innovative new technologies and skilled professionals, and a sustainable industry.

A joined-up policy response, with strong leadership to address the image of digital games could encourage the emergence of good practice. Simultaneously, it could help the development of a European industrial strength in game-based techniques across sectors, and the employment of professionals in both the supply and application sectors. Policy makers have an opportunity to work together with stakeholders from an enthusiastic community of social entrepreneurs from research, business and practice who are developing the use of digital games for inclusion and empowerment, not only a the level of individual game use, but in view of harnessing interactive media and the culture of gaming to facilitate transformatory changes in the way that people at risk are empowered to take control of their lives.

1. Digital Games and Gaming for Empowerment and Inclusion (DGEI)

1.1 Introduction

Social exclusion is a key concept in Europe social policy, and both the Europe 2020 strategy and the Digital Agenda for Europe aim to ensure greater social and territorial cohesion, with particular focus on employment. In 2012, over 23% of the EU's population is considered to be at risk of poverty or social exclusion (EUROPE 2020 Targets). This amounts to over 110 million people. The poverty risk for the unemployed is particularly high at 45.2% Therefore ensuring equal employment opportunities for all in society, especially for vulnerable social groups, such as people with low literacy, migrants, and young people who are not in education, employment or training (NEETs), has become a fundamental moral imperative, as it increases the chances for these people to enjoy active and productive participation in society. In the case of adults, social inclusion not only involves successful labour-market participation but also the maintenance of wellness throughout life. Demographic aging calls for new ways of coping with aging, empowering individuals to stay active in work, family and the community. ICT-based empowerment strategies encouraged by the Digital Agenda offer promising new opportunities in this regard.

Digital games and gaming contribute a novel and compelling instrument to assist in addressing the key challenges set out in the Digital Agenda for Europe: *"The digital era should be about empowerment and emancipation; background or skills should not be a barrier to accessing this potential".* Developing the use of digital games could also contribute to the *New Agenda for Skills and Jobs,* the *Digital Agenda, An Agenda for New Skills and Jobs,* the *Platform to fight Poverty and Social Exclusion* and *Innovation Union* Flagship initiatives.

This report sets out to articulate the potential impact of existing and potential future solutions, and explore the technological, research, market, human capital, socio-economic, and policy challenges of putting digital games at the service of empowerment and social inclusion.

The DGEI study, through literature reviews, consultations and case studies provides an up-to-date picture of the state of the art of DGEI, and outlines the general and specific opportunities and challenges in the development and exploitation of digital games and gaming to address important social problems. This report, the detailed annexes and the accompanying workshops provide the basis for decisions on how policy and the activities of stakeholders could best support these developments.

1.2 Social exclusion, inclusion and empowerment

Despite the importance of social exclusion in European social policy, it is recognised as a complex and contested term (Silver and Miller, 2003). "Social exclusion is a process whereby certain individuals are pushed to the edge of society and prevented from participating fully by virtue of their poverty, or lack of basic competencies and lifelong learning opportunities, or as a result of discrimination. This distances them from job, income and education opportunities as well as social and community networks and activities. They have little access to power and decision-making bodies and thus often feel powerless and unable to take control over the decisions that affect their day-to-day lives." (EU Council 2004).[3] Unlike poverty, which refers to the situations of individuals or families with limited resources, social exclusion is conceived of as a social process which includes factors such as discrimination and corporate and public policies that may or may not lead to poverty (Atkinson 1998). Collectively, social exclusion is also "very expensive, economically counterproductive and lays a heavy social and political burden on society." (Bianchi et al. 2006, p.23).

The terms 'socially excluded' and 'those **at risk** of social exclusion' refer to a very broad set of people and communities, including those suffering multiple deprivations, with problematic life histories, negative experiences of life, failing family relationships, with poor experiences with the community and formal social and education services, They may also participate in crime and drug taking, live in fear

3 COUNCIL OF THE EUROPEAN UNION (2004) Joint report by the Commission and the Council on social inclusion 7101/04

of crime, have behaviours that can lead to poor health, and experience educational failure and long term unemployment, etc (e.g. Bradshaw 2004). It also refers to people who are currently experiencing a particular deprivation factor such as unemployment, long term health problems, disability, mental health problems (Eurofound, 2003), discrimination (ethnic, gender, sexuality, disability), material poverty or poor educational attainment, which puts them at further risk of deepening poverty, developing chronic health problems, etc. These individuals and communities can find themselves excluded from conventional social protection systems, labour markets and community activities and unable to control their own lives (EU Council 2004).

Social inclusion policies that aim to prevent social exclusion cut across many policy domains. They are not only social protection policies which mitigate risk at a societal level through tools such as minimum income, or pensions; they include health inequality policy, housing policy, lifelong learning, labour policy and a range of other policies addressing structural factors. Among these are *active inclusion* policies that focus on ***empowering*** individuals, families and communities to overcome exclusion through the actions of government, mainstream and specialised public services, the third sector and employers. These policies aim to "enable people to do what is important to them, to grow as competent subjects who have control over their lives and surroundings" (Makinen, 2006, p.381) and "gain the opportunities and resources necessary to participate fully in economic, social and cultural life and to enjoy a standard of living and well-being that is considered normal in the society in which they live" (EU Council 2004). In this context, **social inclusion and empowerment** are considered to be complex and multi-faceted **processes,** by which individuals and communities move out of, or avoid, social exclusion.

Social inclusion can be facilitated in many ways, depending on exclusion factors, and the pathways taken out of social exclusion. For example, pathways to employability taken by young people in deprived neighbourhoods can be quite different to pathways taken by older people to wellness and health. However, some common elements emerge across the literature, such as the need to develop **personal autonomy** and the importance of **social support**. In the case of individuals, people gain **control of their lives** though development of capabilities and capacities, including skills, social capital, wellness, self confidence and self-efficacy, which in turn are built up through civic participation, work and education. Interventions to promote empowerment and inclusion address individuals and their communities through special support programmes, or structural features such as housing, health services, general education services or social equity, and aim to turn the vicious circle of exclusion into a virtuous circle of inclusion. While there are many known ways to do this, the sheer number of people at risk of exclusion illustrates the pressing nature of the problem.

Today, the crisis highlights the EU agenda for more effective and efficient social inclusion and social protection (EU Council 2010).[4] As the European platform against poverty and social exclusion points out, there is a need for ".....social innovation to find smart solutions in [post]-crisis Europe" - in other words, to explore new tools and techniques, such as those described here, to address this agenda. While the use of digital games will not directly address hunger or poverty, the argument for their adoption is based on the innovative ways that games can facilitate learning and participation - empowerment processes with positive outcomes for individuals and community.

1.3 Why digital games for empowerment and inclusion?

Digital games are being developed and deployed for non-leisure purposes, in commercial markets, such as corporate training and planning, advertising, political communication, military training, in culture, science, and all areas relevant to social inclusion policy, such as health and wellness, vocational training of professionals, education, integration of migrants, employability, aging and social inclusion. Why? From the perspective of social inclusion and empowerment, it is claimed that digital games, like sports, arts and play, offer an effective means for inclusion intermediaries such as teachers, trainers and health and social workers to assist people at risk of social exclusion. They may provide a cost-effective approach, compared to other direct interventions, to assisting individuals and populations at risk of exclusion, especially when more conventional approaches are considered to be 'failing'.

Anticipating the findings of this report, a review of practice shows three main issues are being addressed through use of digital games today:

- **Support for disengaged and disadvantaged learners, enhancing their employability and integration into society.** This includes helping people with learning disabilities and young people to be more employable, and to reinsert them into education. This is the area with the greatest activity, focused primarily on young people.
- **Promotion of health and well-being:** This includes applications which aim to raise awareness about certain physical and mental health issues, promoting health and well-being either as part of prevention, or in support of those who are dealing with health problems. These applications have been developed for all ages and backgrounds, such as children in hospital, people who need to change their diets and improve their fitness, mentally-ill patients in rehabilitation, and the 'active aging' of older people.

4 Draft joint report on Social Protection and Social Inclusion, 2010, Council of the European Union, Feb 2010, 6500/10

- **Fostering civic participation and community-building:** For example, games which raise awareness about important social policy issues, such as equity and poverty, and enable participatory community planning. Work in this area is often focused on young people, and games have been identified as a powerful communication tool. However, these games can be used for all age groups in both the developed and the developing world.

These practices have been reported to produce outcomes for a range of groups of people at risk of exclusion though means such as building confidence and motivation, developing skills building social capital and increasing awareness of issues of social exclusion.

As well as presenting evidence for activities and impacts, and the theoretical underpinnings of how digital games deliver positive outcomes this report explores *how* this is happening: the actors and stakeholders involved, and the challenges they are facing. It reports on the challenges faced in developing and using digital game-based approaches, including innovation of new techniques and products, the development of use by professions supporting social inclusion, and in the collection of evidence of impact by researchers.

Practice shows that successful development and application of digital games to enable social inclusion ultimately depends not on the technology, but on context of use. This includes the support interventions and socio-economic scaffolding made available to families, the community circumstances, and the education, employment, and social protection systems and services in place that both create social exclusion, and also offer pathways to social inclusion.

1.4 Policy context

The fight against social exclusion, through education, employment, equity and social protection is a key priority of current EU policy. Three of the five goals of Europe 2020 address key factors in social exclusion:

- **Employment,** 75% of the 20-64 year-olds to be employed;
- **Education,** reducing school drop-out rates to below 10%, and to at least 40% of 30-34–year-olds completing third level education and;
- **Poverty and social inclusion**: at least 20 million fewer people in or at risk of poverty and social exclusion

These are addressed by five of the major flagship policies: Youth on the Move, the Digital Agenda for Europe, the Agenda for New Skills and Jobs, the European platform against poverty and social exclusion, and the Innovation Union.

The Digital Agenda for Europe (DAE) addresses social inclusion through **Pillar 6: Enhancing e-skills (Action 66). Action 57** (Make digital literacy and competences a priority for the European Social Fund) and **Action 59:** Make digital literacy and skills a priority of the "New skills for new jobs" Flagship.

The latest actions of **The European Platform against Poverty and Social Exclusion** (EPAPSE) are set out in the 2012 Communication and Employment Pack,[5] the Youth Employment Package and the Social Investment Package.[6] The Commission focuses on delivering actions across the policy spectrum. The principal aims of the platform, as this report demonstrates, all focus on areas where digital game use has relevance: improved access to work, social security, essential services (healthcare, housing, etc.) and education; better use of EU funds to enable social inclusion and combat discrimination; social innovation to find smart solutions in post-crisis Europe, especially in terms of more effective and efficient social support; and new partnerships between the public and the private sector. There are specific policy goals and actions for target groups such as migrants and older workers.

The **Agenda for New Skills and Jobs** sets out the routes for bringing more people into employment, with measures addressing supply and demand. On the supply side, this includes "Equipping people with the **right skills** for the jobs of today and tomorrow".

The Flagship **Youth on the move** aims to improve the quality and attractiveness of education and training in Europe.

Finally, **Innovation Union policy** addresses job creation and quality through innovation and new industry, public sector and social innovation and e-skills. Among the sectors explicitly targeted as having potential to create growth and jobs are the **creative and cultural sectors** (Com (2012) 537).

In addition, **EU regional policy** for job creation, competitiveness, economic growth, improved quality of life and sustainable development within the framework of the Europe 2020 strategy is also closely interconnected with the delivery of social inclusion policy, especially in light of the current debate on the reform of the **EU Social Cohesion policy.**

Finally there are a number of other policy domains that touch on digital games, such as **competition law**, and **regulation of the media industry that are relevant to both supply and demand.**

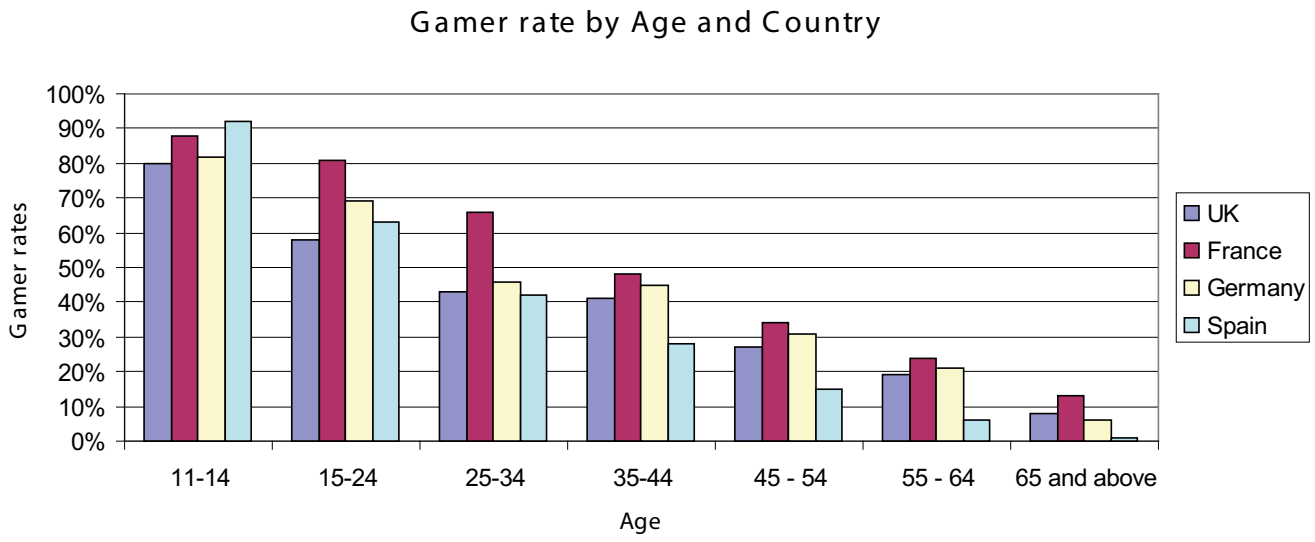
1.4.1 Opportunities for policy

This report presents evidence to show there are opportunities for policy in three broad categories:

5 COM(2012) 173 final Communication: Towards a job-rich recovery, 18.4.2012 http://ec.europa.eu/social/BlobServlet?docId=7619&langId=en

6 COM(2012) 0727 final Moving Youth into Employment; COM(2013) 83 final Towards Social Investment for Growth and Cohesion – including implementing the European Social Fund 2014-2020.

Figure 1: Gamer rates France, Germany, Spain and the UK Q4 2011 - Q2 2012 (Source ISFE 2012)



- **Employment and growth** could benefit from attracting, rewarding and sustaining innovation in digital gaming in general, and in 'serious games and gamification' in particular;
- The availability and use of appropriate digital game-based practices and products could contribute to **social cohesion and individual and community empowerment and inclusion**; and
- Digital gaming could also contribute to the **effective provision of services meeting public policy goals,** such as education, health and social welfare, delivered by the public, third sector, or social enterprise.

These will be detailed and explored in reference to the flagship policies in the conclusions (Chapter 4).

1.5 Basic concepts: digital games and meaningful play

1.5.1 Digital games: definitions, use, and qualities

The term **digital game** refers to a multitude of types and genres[7] of games, played on different platforms using digital technologies such as computers, consoles, handheld, and mobile devices (Kerr, 2006). The concept of digital games embraces this technological diversity. In contrast with terms such as 'video games' or 'computer games', it does not refer to a particular device on which a digital game can be played. The common factor is that digital games are fundamentally produced, distributed and exhibited using digital technologies. Games can be played alone, in groups, with and against machines, or other people, and even as a professional sport (see glossary in the Annex for definitions of types of games). A mini-game can take 10 seconds to play; a massively multiplayer online game can have thousands of people playing together in an ever-changing, never-ending virtual world. A digital game is a creative, aesthetic and a technological product, and digital gaming represents a rich culture of practices of game use and consumption, and the output of a major creative and technological industry.

Digital games of all types are enjoyed by millions of people. In 2010, the world market exceeded 56 billion US$ according to estimates by PwC (2009) and could to grow to a global turnover of more than 82 billion US$ by 2015. Popular games, such as The SIMs, sell over 10 million copies, and Nintendo has sold over 300 million portable consoles (De Prato et al 2010). Children, the traditional core market, have particularly high user rate (reaching over 90%), but adult markets too are expanding consistently and fast. A recent panel study by ISFE (2012) puts average digital game player (gamer) rates for the whole 11+ population in the UK at 35%, France 46%, Germany 25% and Spain 29%.[8]

Like use of the Internet in the early days, usage drops away steeply with age. However, while many general online services now have high uptake among older people, this has only occurred slowly in relation to digital games. The strong effect seems to be due to the cohort of people who used games as children taking this practice into later life.

Women are increasingly gaming too, as children, and into adulthood. Recent US data puts female players at 47% of total game players,[9] with adult women a major growth

7 For an overview and discussion of game genres, see the work of Apperley (2006)

8 A Gamer defined as someone who played a video game on any platform in the last year, data Q4 2011 - Q2 2012

9 Entertainment Software Association figures http://www.theesa.com/facts/gameplayer.asp

Table 1: Gamer rates by gender in France, Germany and the UK Q4 2011 - Q2 2012 (Source ISFE 2012)					
Age	**11-14**	**15-24**	**25-34**	**35-44**	**45+**
France					
Female	89%	75%	59%	43%	23%
Male	87%	86%	72%	53%	23%
Germany					
Female	81%	62%	39%	41%	15%
Male	83%	75%	52%	49%	21%
UK					
Female	75%	49%	36%	37%	17%
Male	85%	66%	51%	45%	17%

market.[10] Male and female gamer rates for France, Germany and the UK are illustrated in Figure 1.

Digital games offer an alternative model of technology use to many text-based information and communication services, one that is based on play, cultural consumption, sociality and relaxation. 'Casual' gaming, playing games with relatively simple rules and interactions, as opposed to 'hardcore' or core gaming markets, is capturing an up-to-now unsatisfied demand across generations, socio-economic classes and gender, and thus becoming mainstream across society.

Games are not a static set of products, technologies or genres. Digital games first brought the power of computing to the home market in the 1980s, and over the years, the industry has pioneered new technology: interfaces based on gesture and movement, advanced computer graphics sophisticated levels of artificial intelligence and high performance real-time online systems. Now mobile games, social media games and online games are creating new genres and new audiences. In 2010, the social media game Farmville had 75 million users (Stewart and Misuraca 2012). Figures for the three months ending February 2012 suggest that in five major European markets 42% of smartphone users played a game at least once a month.[11] Other figures put rates of game playing on smartphones at around 30% of all German, French, UK and Spanish 15-24 year olds (ISFE 2012). Digital games, perhaps the most 'social' of all media forms, are also leading new practices of cooperation and sociality online.

Why are digital games so popular? Digital games bring together a whole range of techniques to **engage** players. A concept that is often used in the context of enjoyment in games is that of 'flow' (Csikzentmihalyi, 1990) - a state of mind attained during activities such as sports, dancing, playing music and playing digital games (Hoffman & Novak, 2009; Chiang et al., 2011). Games bring together a number of techniques to produce this engagement. Some of these are characteristic of other media, such as images and sound, narrative and character (think Mario, or Laura Croft), often with unique video game aesthetics. Other characteristics are particular to games, such as game mechanics, rules and goals[12] (Sicart 2008; Järvinen 2008; Salen & Zimmerman 2004), including familiar elements such as levels, points, leaderboards, avatars, badges, power-ups and multiple lives. They also offer a range of interactive machine-human interfaces to control the games, and the ability to play against and with other people, face to face, or online. These techniques are used to create **motivating features** such as a sense of control, feedback, challenge and competition, autonomy, realism or fantasy, drama and reward etc. The games industry, from big global studios to bedroom indie developers, continues to push the boundaries of what can be done with these techniques, making games that suit every personality, culture and occasion.

The diversity and richness of types of games also means that there are disagreements about what a counts as a digital game. There is no single agreed-upon definition of games, particularly in the academic field of game studies,[13] but De Freitas (2006) points out that this process of definition is very important. How we define a game will influence its development, and hence conclusions on what can be learned from them and their use in practice. The definition and its extensions also dependent on whether games are viewed from an art and design, technological, user or business perspective.

A definition of a game: *"a rule-based formal system with a variable and quantifiable outcome, where different outcomes are assigned different values, the player exerts effort in order to influence the outcome, the player feels attached to the outcome, and the consequences of the activity are optional and negotiable."*(July 2003).

10 ESA claim adult women are 30% of digital gaming population, and Mom Central consulting suggests nearly 70% of mothers play 'casual' games http://insightblog.momcentralconsulting.com/2012/02/moms-and-the-rise-of-casual-gaming.html

11 European Mobile Gaming Gets Social: Rise in Smartphone Adoption Drives Increase in Mobile Gaming and Social Play April 26, 2012. Online survey covered FR, UK, DE, ES, IT (46.4 million smartphone users representing 42 percent of the 'EU5'audience)

12 Game mechanics is a contested term roughly meaning the interactions, feedback and core actions of the players afforded by a game design.

13 For an overview of the games studies field (Aarseth 2001), The International Journal of Computer Game Research represents a good starting point http://gamestudies.org/

In this report, we use the term digital games to refer to games that fulfil this definition, but extend this to concepts such as virtual worlds or gamification, based on what is produced in the real world, and by the video games industry. Much of the controversy over definition of 'serious games', gamification and the role of 'fun' arises around these uses. Nevertheless, this broader set of 'digital game' formats are being exploited to address empowerment and inclusion, and should be considered as a key contribution and resource emerging from the digital games arena. These extensions of 'pure' digital games fall into three broad approaches: 1. those that create products built on the graphics and the interfaces of games, 2. those that focus on the 'gameplay' aspects of games, and 3. those that involve users in the co-creation of digital games (see Table 2).

An increasingly important approach to understanding digital games is the concept of **play**, which can be seen as both non-utilitarian and utilitarian (Schouten 2011). Play can be a voluntary, fun activity per se but can also be used for purposes such as learning, social practices, values and work (Blanchard 19995, quoted in Rieber *et al* 1998; Zyda, 2005 p.4). Play, and therefore digital games can be *serious* (Rieber *et al* 1998). Hence the attempt to develop and define **serious games,** and **serious uses of entertainment games** based on the notion of the value of **serious play**. One such definition of serious games is "...a mental contest, played with a computer in accordance with specific rules, that uses *entertainment* to further government or corporate training, education, health, public policy, and strategic communication objectives." (Zyda, 2005, p. 26). During the 1980's and

Table 2: Extending the boundaries of digital games

Game-based approaches that build on the 3D graphics and interfaces of games.

These include **Simulations**, "simplified, dynamic, and accurate model of reality" (Sauvé et al., 2007) and **Virtual worlds**: "a synchronous, persistent network of people, represented as avatars, facilitated by networked computers" (Bell, 2008). Many products labelled serious games, use this approach. These may often look like digital games, and use the technology of digital games, but have few 'game-play' features that create the intrinsic motivation to play. However, the 3D graphics, and interaction modes familiar from games are nonetheless powerful tools and give the user the ability to explore, visualise, replay and experiment without real world impact. What is more, the availability of the game tools and platforms can replace custom-made simulation platforms at a fraction of the cost - an important feature of the landscape of digital games for non-leisure purposes.

Game-based approaches that focus on 'gameplay' aspects of games

A characteristic of games, including digital games, is that players are given some form of agency. Hence, understanding games requires also looking at what players do with the game, how they make sense of it through **meaningful play**. In the evolution of game play, three trends can be distinguished which are blurring the boundary between game and non-game space and activities,

1. **Gamification**: Applying game design elements to non-game activities (see Bunchball white paper, 2010; Deterding, 2011) which often aim to change attitudes and behaviours.

2. **Pervasive games**: Games that expand beyond traditional temporal, spatial and social conventions of play, often facilitated by mobile devices and other media (see Montola, 2005) and

3. **Digital play**, which can be much broader than play though digital games or purposefully designed gamification. This includes many online activities that are essentially meaningful play activities, such as posting to Facebook, drawing and painting, or taking part in chat online.

Game co-creation

These approaches are **blurring the boundary between game player and traditional 'creator'**, and involving people in a non-trivial component of the design, development, production, marketing and distribution of games. This can include making games from scratch, modifying or 'modding' existing games (Sotamma, 2005), running game platforms etc. It can be conducted with minimal technology and expertise, or it can require users to learn a range of game development and management skills. This approach challenges us to rethink what it means to play a digital game (as rules can be tinkered with and play can take place anywhere, anytime, game play can become quite open-ended) and to consider the implications for business (open innovation) and government (community engagement) and empowerment (co-production).

90's, digital games were developed for education under the umbrella of 'edutainment'. However, these games often failed, offering "drill and practice activities, masked with less than entertaining game play" (Van Eck, 2006). Today many so-called serious games extend far beyond the teaching of facts (Michael & Chen, 2006) and aim to facilitate gamers' higher order thinking skills or problem solving skills (Charsky, 2010).

However, the contemporary use of the term 'serious games' fails to capture just how it is that games have instrumental value, since this use loses the concept of play. The concept of **meaningful play,** (Salen and Zimmerman, 2004), may be the most appropriate way to understand the serious value of digital games (De Schutter and Vanden Abeele, 2008). Meaningful play emerges from the interaction between players and a game. It refers to a mutual shaping process, in which the player actively makes sense of the game and this sense-making activity is structured by the game rules, the immediate context in which the game is played and the cultural backdrop. The concept of meaningful play is both richer than 'serious games' and open to the hypothesis that playing mainstream entertainment videogames may also support 'serious' outcomes. It also acknowledges that games can be entertaining and informative at the same time.

At one level, we can treat all games from this neutral perspective. However, it is necessary to distinguish between games that have been developed *for a purpose* beyond entertainment and those that were not. This study refers to the former category as **special-purpose games** and the latter as **commercial off-the-shelf games (COTS).** *This does not imply that special purpose games for learning etc are not commercially viable,* but it is a term in common use. This report will use the term 'serious games' when referring to work in which this specific label was used, and in relation to the emerging 'serious games' industry, but will otherwise avoid the term, as it suggests that entertainment COTS games are not to be taken seriously (Susi, Johannesson & Backlund, 2007).

It is clear that current thinking and activity around the use of digital games is much broader than using packaged products: terms such as *digital games* and *games-based practices* can thus refer to the playful and non-playful practices of using, consuming and even producing digital games.

1.5.2 Games for learning and participation: key ideas

As hinted at in the previous section, a key element in the understanding of how digital games work, and thus how they can be understood as facilitating both empowerment and leisure is the way that they promote **learning.** This is not the only way they work, but a key one, which is the concern of the vast majority of research in this field. The learning approach used here is not limited to knowledge transfer and skill development, but encompasses learning as a rich social and psychological process with a range of processes and outcomes for individuals and groups. De Schutter and Vanden Abeele (2008) suggest games support learning because:

1. They allow experimentation within **safe simulations** of reality, and their *re-playability* enables practice and trial-and-error testing.

2. The qualities of challenge player control and compelling sensory experiences games are **intrinsically motivating, a key feature in promoting individual empowerment** and,

3. Games, designed for spontaneous in-game collaboration and community formation, can become the subject of **social interaction and communities** which can contribute to players' motivation (Dickey, 2007) and the empowerment of both players and those who seek to accommodate game play (Rao, 2008; Järvinen, 2009).

The relationship between the social component of digital game play, learning, and inclusion and empowerment becomes particularly evident in the concept of **participatory culture** (Jenkins et al., 2006b). Young people in particular are increasingly involved in a culture "with relatively low barriers to artistic expression and civic engagement, strong support for creating and sharing one's creations, and some type of informal mentorship whereby what is known by the most experienced is passed along to novices. A participatory culture is also one in which members believe their contributions matter, and feel some degree of social connection with one another (at the least they care what other people think about what they have created)." Game play, through the medium of video games and other interactive social media, is inherently part of this participatory culture. The development and use of new **media literacy** skills seems to fit particularly well both the goals and the context of empowerment of individual and communities in the 21st Century.

What is the impact of playing video games? Most of this report examines the evidence for outcomes in learning and participation processes of the use of digital games in the context of education, groups at risk, and interventions to empower individuals and communities, however it is worth noting that there is a growing bank of evidence for the value of leisure game playing, especially in children. While there are certainly negative outcomes from leisure game playing both online and offline, sufficient to promote policy concern (Buckingham et al, 2007; Byron 2008; Young 2009; Bösche and Kattner, 2011), this evidence reveals many positive reasons that people play video games – the personal empowerment, creativity, learning and socialisation outlined above (Olsen, 2010; Gee, 2003) (see Section 2.9). While this evidence comes from assessments of outcomes via sampled populations, individual and micro-level research, there is little evidence of the impact of video games at the level of the whole populations. One exception is a recent JRC-IPTS analysis of the 2009 European Programme for International Student Assessment (PISA) dataset that assesses 15 year-old school students' performance. This finds negative correlations between the use of ICTs (internet

and computers) at school or at home with test results in most countries surveyed, but finds that in many countries **playing video games at home, is significantly and positively correlated with PISA test scores** (Biagi & Loi, 2012). This is not a causal link, and in many cases game playing is not correlated negatively or positively, but this finding raises many questions about how society values video game playing.

There is clearly much we do not know about the impacts of video games in society, and the value for policy. This report has brought together some of the existing evidence for understanding the positive value of digital games use in a whole range of situations and uses these to point in the direct of how policy makers and other stakeholders could exploit this.

1.5.3 Constituencies of action and thought relevant to DGEI

The ideas and actions for the use of digital games in non-leisure settings, and the understanding of the positive benefits and outcomes of digital gaming are emerging from a number of identifiable constituencies of practitioners and researchers, and around particular driving concepts: serious games, digital game-based learning, meaningful play and games for good (Change) and more recently, accessible gaming and gamification. There are strong overlaps, but distinct industry, practitioner and research communities can be observed. Each of these represents a community of stakeholders with a particular set of ideas on how to be engaged in the processes of developing the use of digital games for empowerment and social inclusion. However, these constituencies are unlikely to be stable in the medium term. *Gamification* or *games with an impact* may (or are) becoming fashionable concepts, and influential events, individuals and funding programmes can quickly lead to new names being given to existing practices.

Table 3 summarises the key ideas and actors in each constituency. This is elaborated in more detail in Chapter 3.

Table 3: Constituencies of action and thought in DGEI

Key Term	Description	Actors
Serious Games	Controversial but commonly-used term for an emerging research field and growing market for products, services, firms and approaches to addressing real-life issues in training, health and wellness, culture, science etc with digital games and technologies of digital game play and production. Draws on a very wide set of ideas about value of digital games.	'Serious game' researchers and business, conferences,[14] a trade association,[15] journals, prizes, research networks, such as the EC-funded GALA network, the military, US, French, Korean, Singaporean Government
Digital Game-based Learning and Teaching (DGBL)	One of the oldest areas of game use, but the 'poor relation' of entertainment games. DGBL explores all types of digital game use from the perspective of learners and teachers (Prensky 2008) focused on pedagogy and didactics and building sound educational practices around game use. There is a rich research literature. Debate continues over the ways that game-based learning works and should be pursued, emphasising or denigrating features such as 'fun', engagement or simulation (Susi et al 2007).	Educational researchers, primary and secondary formal and informal education, tertiary education, journals, conferences, research programmes, training and elearning business and mainstream videogame industry.[16] Despite decades of research, actual uptake is still relatively low.
Games for Change/ Good	The 'activist' wing of serious games is concerned with social change or social benefit. Explores the use of games to raise awareness of political issues among the public or political leaders, build community participation, or support behaviour change on topics like energy consumption	A movement dating back at least 10 years with participation from social enterprise, researchers, the third sector, and International Development community.[17]
Meaningful Play	A concept used in psychology and education, for example, to understand the role of learning through play. Explores the interaction between player action and system outcome, and individual and collective player behaviour in games (e.g. economic behaviour). Also developed in academic field of Game Studies and Ludology (e.g. Järvinen 2008).	Academic researchers, psychologists and educators
Gamification	Application of game design elements to non-game activities often with the goal of engaging people more in these activities (Bunchball white paper, 2010; Deterding, 2011), and more generally changing behaviour and attitudes 'for the better' (McGonigal 2011). Often simply implemented in online services with the proliferation of 'badges' and competitive elements. Gamification would seem to be a counterbalance to some of the serious game activity, by focusing on the gameplay elements of games, but is being appropriated by the existing serious game constituency.	The focus of activity is largely around consultants drawn from a range of industries, and there is a certain degree of hype. Psychologists, marketing specialists, policy makers in public health and energy.
Accessible Games	Addresses the accessibility of digital games to disabled people who are restricted in their ability to play and enjoy digital games alone or with others. While the primary focus is on young people, attention has been drawn to older people with age-related disabilities for whom age can start to restrict the ability to play digital games (Robinson and Walker 2012).	Disabled rights campaigners, disabled people, ICT inclusion policy makers

14 For example: The Serious Game Summit, Serious Play Conference 2012, Games for Health, Games Beyond Entertainment Week, Mobile Serious Games Conference etc

15 Serious Game Association http://www.seriousgamesassociation.com/

16 See for example Ellis et al (2006) Unlimited Learning - computer and video games in the learning landscape, a report on games use in schools published by the Entertainment and Leisure Software Publishers Association

17 Especially http://www.gamesforchange.org/

1.6 Aims and methodology

This study set out to understand the industrial, market, social opportunities and limitations of digital games for user empowerment and as a tool for socio-economic inclusion of people at risk of exclusion. It also sought to identify the technological, market, implementation, adoption and policy challenges of creating this potential and look into whether policy actions could address the challenges identified and if so, how. The study was scoped and coordinated by the ICT for Inclusion team at the IPTS.

This report is based on:

1) A commissioned expert report from IBBT/iMinds (BE) on **State of Play of Digital Games for Empowerment and Inclusion: Opportunities and Challenges** (Bleumers et al 2012) including:

- A state-of-the-art review identifying the field, its specific application domains, facts on adoption and diffusion, available research evidence, relevant theoretical perspectives and knowledge gaps;
- Case studies describing well-documented cases in the field and the factors contributing to their success or failure;
- A conceptual framework that fosters understanding of the potential of games for inclusion and empowerment and the opportunities and challenges that stakeholders in this domain face;
- Conclusions from a research and policy perspective, proposing future research tracks and a set of practical guidelines for policy makers.

A more complete fully-referenced discussion of much of the evidence presented in this report is available in the state-of-the-art report (Bleumers et al 2012).

2) A background paper on the video games industry and the serious games industry: **The industry and policy context for DGEI: market analysis, future prospects and key challenges in videogames, serious games and gamification** (Stewart and Misuraca 2012). This was complied by IPTS on the basis of earlier JRC-IPTS reports on Video Games: e.g. "Born Digital/ Grown Digital. Assessing the Future Competitiveness of the EU Video Games Software Industry" (De Prato el al 2010) and Feijoo, C., et al. (2012) Mobile gaming: Industry challenges and policy implications Telecommunications Policy. In addition, the IDATE Market Reports (2008-2010-2011) were referred to (these constitute one of the few industry sources on serious games), along with other relevant literature, addressing the evolution of the industry from a technological and market perspective, identifying barriers and drivers of change, the key players, emerging trends and future directions.

3) **Four workshops:**

i) An Expert Workshop held at IPTS in Sevilla on 23-24 Jan 2012. A full list of experts drawn from research practice and industry is included at the end of this report. The workshop produced extensive recommendations that have been summarised by IPTS and IBBT/iMinds and integrated into this analysis. Presentations from the workshop are available on the IPTS website.

ii) A Policy Makers' Workshop held in Brussels September 24 2012 to discuss the policy dimension and impacts of this study.

iii) Stakeholder Workshop, held in Brussels in October 2012 with representatives from policy, research and practice to debate the opportunities and challenges as presented in the study, and to recommend actions and a strategic roadmap for DGEI. This is published as a separate document: '**A Roadmap for Action on Digital Games for Empowerment and Inclusion in Europe'.**

iv) The DGEI 'Cluster Meeting', organised by the coordinators of three FP7 projects developing game-based approaches to social inclusion.

4) Interviews and contributions from experts in the field, including five cases describing the development and use of digital games and gaming focusing on policy actions and systemic change.

This evidence is brought together for the first time in this document and associated reports.

The study demonstrates that in practice *digital games used in particular ways in particular contexts can empower individuals, and communities in ways that lead to social inclusion, and* in theory, *this could be generalised.* The current state of the evidence does not support a deterministic model of impacts, based on some inherent properties of digital games which automatically lead to empowerment and thus social inclusion of individuals, partly because social inclusion and empowerment covers such as diverse range of situations and people, and partly because there are many ways of using digital games.

Figure 1 illustrates the types of evidence and arguments brought together to provide explanations of: 1) how digital games can support social inclusion and empowerment, and 2) the processes by which this is brought about in practice.

First (A), a range of **original and secondary empirical research** and **theoretical arguments** are cited to provide insights into how games-based practice are used, including playing, designing and making games (A, Chapter 2). The vast majority of this research comes from the field of education and learning, with roots in physiological and to a lesser extent, sociological disciplines. The theoretical discussion and argumentation has a learning perspective, and many of the empirical examples are drawn from specifically educational contexts, although they are focused on populations and interventions with direct relevance to social inclusion. There is no single theoretical learning framework: the framework

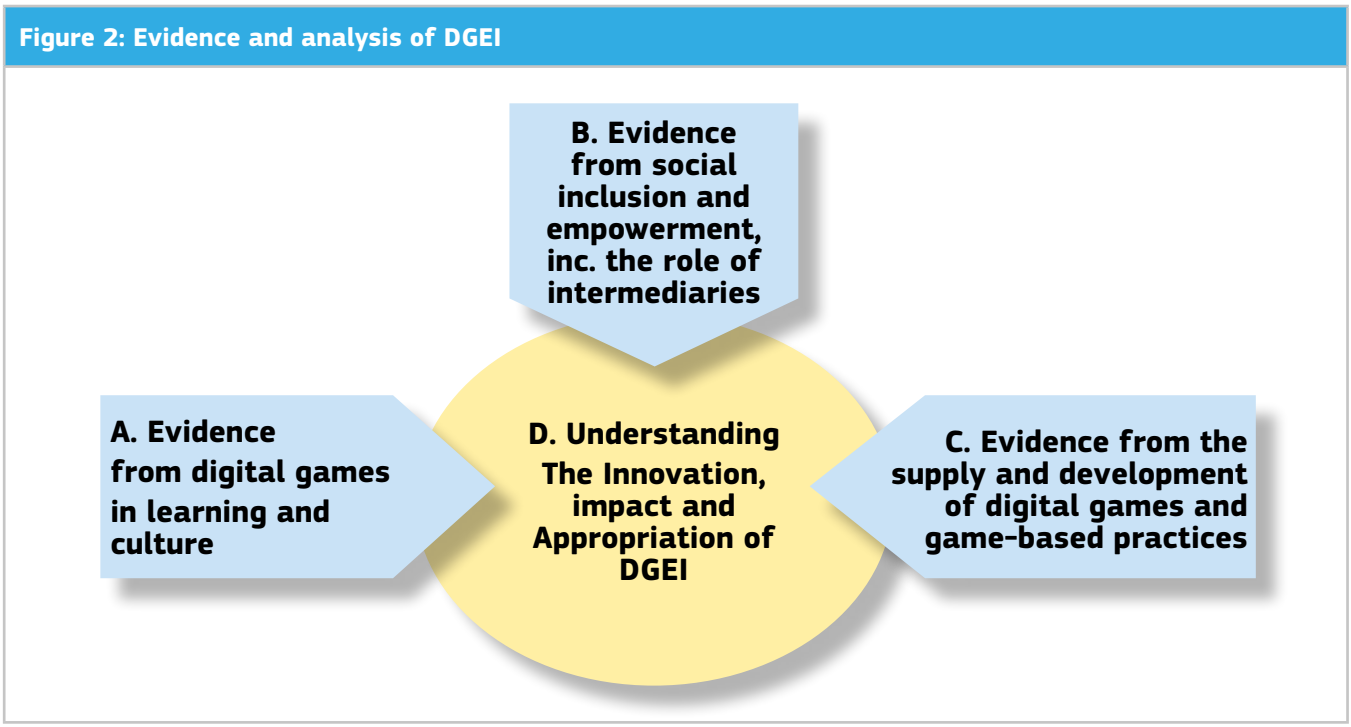
proposed in this reports is a synthesis of multiple strands of research.

The second set of evidence (B, Chapter 2) is based around the activities of **social inclusion intermediaries** who work with those at risk of social inclusion in contemporary society. It is recognised that while digital game-based practices can be addressed directly to end users, in the field of inclusion and empowerment they will generally be selected and used in the professional practices of intermediaries such as teachers, health professionals, community activists, social workers, and their respective institutions and professions. Success in game development and use is explored from the perspective of the individual and structural capacity of intermediaries to appropriate and exploit digital games, and their role as gatekeepers and co-producers of game-based empowerment practices.

Thirdly (in C, Chapter 3) this report situates these uses and developments in the wider context of trends in development, design and use of digital games for entertainment and applied uses. Again, insights are drawn from established knowledge about the **video games industry** and emerging knowledge about the **serious games industry**. Chapter 3 also includes discussion of the role that **policy makers** have played in relation to the video games industry and the use of digital games for non-leisure purposes.

Overall, these are tied together with an approach that highlights the processes and practices of innovation and appropriation, and the challenges faced by different actors and stakeholders in making DGEI work effectively (D, Chapters 3 and 4).

Figure 2: Evidence and analysis of DGEI



The report is necessarily partial, and not only due to limiations of the study. Digital games-based practice for community development, wellness and health is much less developed than in other areas of education and training, and there is much less evidence of practice and impact available. Equally, evidence and analysis of the emerging 'serious game' sector is patchy and with few reliable sources.

For more information and all the reports and presentations associated with the DGEI study, please visit: http://is.jrc.es/pages/EAP/eInclusion/games.html

2. Digital Games for Empowerment and Inclusion

2.1 Introduction

This chapter explores evidence to help build a picture of the use of digital games for empowerment and inclusion. This is built on review of activities of social inclusion intermediaries, researchers, game developers and policy makers: their games, projects, studies and programmes.

First, Section 2.2 introduces some of approaches for understanding empowerment that shape what we look for in the empirical evidence of initiatives using digital games.

Section 2.3 reviews practice and existing **taxonomies of game application** to identify three main areas of game use focused on issues of interest to social inclusion and empowerment. Sections 2.4 surveys the empirical landscape of game use and development in these domains, Section 2.5 reviews research literature on impact in the field of game use in related areas to DGEI. Sections 2.6-2.8 introduce original case material produced for this report, identifying the social inclusion and empowerment outcomes reported in current cases.

Section 2.9 moves to the domain of **research results**, exploring how studies help us understand how games can enable learning, participation, empowerment and social inclusion, the actors involved in developing game-based practice. This introduces a **framework for understanding the value of digital games** for learning, based on evidence and theory, including the types of empowering outcomes. Section 2.10 explores the benefits and drawbacks of **the three ways of using games**: special-purpose games, Commercial off-the-shelf games (COTS) and games making,

Sections (2.11 and 2.12) attention turns to evidence for adoption, with figures for uptake in different sectors, and a focus on the particular to the **role of inclusion intermediaries** (Section 2.13) in making game-based practices effective, and their needs and interests.

Finally, Section 2.14 identifies **gaps in the research knowledge** and Section 2.15 reflects on the evidence in terms of **policy questions relate to effectiveness** and the **potential to build widespread use** of games-based approaches.

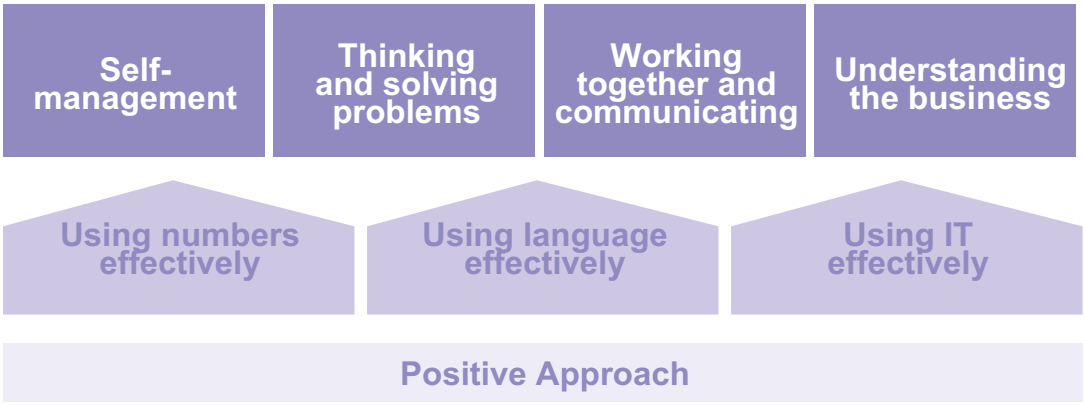
2.2 Overcoming social exclusion: empowerment

There are a range of theoretical frameworks that can be used to understand the processes by which individuals, families and communities can be supported to cope with risk factors and maintain social inclusion. For example, insights from research on psychological **resiliency**, the ability to cope with adverse situations, and related factors such as self confidence and competence have been used shape policy aimed at helping children and young people overcome social exclusion (Schoon and Bynner 2003). This highlights physical and cognitive pathways, and the key role of family and community support to individuals.

From the perspective of **employability**, the literature identifies a range of factors that are important for someone to be 'employable' such as basic skills, interpersonal and technology skills, self-efficacy[18] self confidence and self-esteem, responsibility, problem solving, social capital (itself another useful construct) and orientation to work. (Green et al 2012; Dacre Pool and Sewell 2007; Bates and Phelan, 2002). For example, the UK Commission for Employment and Skills (UKCES, 2009) highlights the fundamental role of positive attitude and motivation. These are characteristics of individual, but arise in specific social contexts, and have to be developed as a prerequisite to prepare people for employment alongside specific skills, and a variety of transferable skills (Figure 3: UKCES employability skills).

18 Self-efficacy, defined by Bandura (1997) as a person's judgements of their own capabilities.

Figure 3: UKCES employability skills



Source: UKCES 2009

We can also consider the actions, often policy led, used to develop employability in certain populations. A current concern are young people increasingly refered to as **Not in Employment, Education or Training** (NEETs). This is a heterogenous set of young people which in recent years has been identified as a key population at risk of exclusion (Eurofound 2012). A common feature of these young people is that they are failing to develop themselves and gain experience necessary to become employed in the long term. Some come from deprivied backgrounds, and often the conventional educational system has failed to address their needs, and other social and educational services have not worked together to support them sufficiently. The Eurofound (2012) study identified a range of types of initatives that are used to either prevent young people becoming NEETs or help them into work or trainingm set out in Table 3. This will be used to explore the role of digital games to support young people at risk in Section 2.12.

Table 4: Policy measures to support NEETs

Measure	Aims	Examples
Measures to prevent early school-leaving	Improve students chances of staying in education, though holistic support within the school environment or at home	• Identification of potential early school leavers • Policies targeting vulnerable areas • Career guidance • Alternative learning environments and innovative teaching methods • Financial support • Greater parental engagement
Measures to reintegrate early school-leavers	Encourage and enable them to return to studies, or find alternative training	• Tracking early school leavers • Second chance opportunities and alternative teaching formats (revitalising interest in education) • Addressing complex personal issues (personalised programmes) • Financial incentives
School-to-work transition policies	Support transition from 'learning to earning'.	• Improving service delivery and offering youth guarantees • Information, guidance and counselling • Works experience and skills development • Entrepreneurship support
Measures to foster employability	e.g. training addressing gaps in transversal and job-specific skills and competences	• Apprenticeships and vocational training • Training courses • Internships
Measures to remove practical and logistical barriers to employment	Address barriers for young people from particular vulnerable backgrounds	• Addressing special support needs • Facilitating mobility and financial support • Employer incentives and subsidies

Source: Eurofound 2012

Another important dimension of social exclusion is related to **health** – where social exclusion arises both from poor health, and from poor quality or low access to health services, and where factors associated with low socio-economic status lead to poor health (e.g. Machenbach 2006). The socio-economic outcomes of ill health are clearly recognised, both for individuals and society (Eurofound, 2003), with long term chronic health problems leading to dependency and exclusion. Public health theories and approaches consistently identify the way that health-related inclusion can be facilitated by a multi-level interactive approach (National Cancer Institute 2005). Interventions address individual behaviour change ('lifestyle') through promotion of self-efficacy, developing motivation, skills, self-confidence and the learning of coping strategies (Dixon, 2008), and interpersonal and community change (Rogers 2007), though support for social cohesion and social capital (Wilkinson, 1999), as well as policies addressing health services and housing, and income poverty. From the perspective of the provision of health care, especially in relation to chronic conditions, there is a similar shift to a patient-centred and a person-centred perspective (Starfield 2011) which recognises a need to support and motivate sufferers, for example in changing health-damaging behaviour or in taking medication, and engaging their social network.

A couple of specific groups can be highlighted that are often addressed by game-based approaches: people with mental health problems and children with chronic conditions. Studies suggest that obese children (Datar & Sturm, 2006) and children with asthma (Moonie, 2008) both suffer reduce educational performance, and poor diet at early age can lead to adult obesity and poor health. These can be tackled by interventions though family, school and cognitive means. Mental health is particularly singled out in the literature as a factor in social exclusion (Eurofound, 2003; Bradshaw et al 2003; Morgan et al 2007), where mental health issues are both the cause and result of social exclusion. Mental health conditions can not only make participation difficult, but even where an individual is coping with a condition, discrimination by others creates new barriers. Addressing social exclusion in this case involves work on awareness and attitudes of society as well as support to individuals.

Approaches such as resiliency and employability identify elements of social context and pathways that people follow towards social inclusion, developing motivation, skills and confidence, coping with health issues, building social capital, and gaining access to resources etc. This can be conceived as a process of ***empowerment***, and the condition of being empowered. A definition of empowerment is not straightforward since it has different meanings depending on the context; socio-cultural empowerment in a political context or individual empowerment in a collective context (Narayan, Stern, Nankani, Page, & Jorgensen, 2002). Empowerment is inherently a complex concept that entails both strengths and weaknesses of an individual or community, and the interplay between the individuals and the social systems in which they live. Most of the literature links the notion of empowerment to a process whereby individuals regain **control of their life** (Lord & Hutchison, 1993). It is also used in the sense of enablement: "Enabling people to do what is important to them, and enabling people to grow as competent subjects who have control over their lives and surroundings" (Makinen, 2006, p.381). Empowerment strategies also emphasise the importance of unity and social cohesion at community level, and the role of social support: i.e. interventions are aimed at communities and institutions whose culture or conduct may be a source of social exclusion as well as a source of empowerment. In addition, empowerment can be considered on multiple levels (i.e. individual, small group, community (Lord & Hutchison, 1993; Van Regenmortel, 2009). Lord & Hutchison (1993) suggest the process normally follows a number of stages, where an individual first becomes *motivated* to achieve change, to where he or she becomes an increasing *active participant* in his or her community before and final attainment of empowerment is achieved.

In attempting to empower people by providing assets and stimulating capability, through, policy-makers may be faced with people's empowered choice to opt out or deliberately self-exclude, a factor of particular importance in political and civic participation.

In general, the field of social inclusion and empowerment of people at risk of exclusion is highly sensitive. Interventions have to deal with people suffering multiple deprivations, who receive support from many different public and third sector services, where unfortunately the quality of these services can also reinforce exclusion. Issues such as protection of minors, medical confidentiality, extremism, mental illness and criminal behaviour make the design and delivery of effective services challenging.

Our analysis will look for features of empowerment in the theoretical analysis of games and the games-based initatives documented. This includes specifically uses of games that address the stage by stage building of self confidence, competences for coping with disability and health conditions, and basic and transferable skills for work, and that address individuals in the contexts of their community, social network and their social capital.

In Section 2.13 the role of professionals and organisations that do the work of facilitating empowerment and social inclusion – referred to here as inclusion intermediaries – is explored in more detail.

2.3 Basic taxonomies for DGEI

Digital games are being put to use for a variety of purposes other than entertainment across a variety of sectors. Various ways of categorizing these applications have been proposed. Sawyer and Smith (2008) consider serious games on the basis of *industry sector* of use (defence, health etc) and *types of games* (e.g. games for health, advergames).

The EC funded IMAGINE project,[19] developed a classification based on of *genres* and forms of digital game for use in games based learning. Alvarez and Djaouti (2012)[20] classify games with a rich and more complex taxonomy of factors – gameplay, purpose, market, audience, age, genre and theme. They also propose a simplified approach categorising the way that Serious Games *address issues*. **Communication games**; **Narrow training games:** (aimed to improve users' cognitive/motor skills) **Educational games** and **Simulation or 'serious play' games)** Alvarez et al (2012).

It is clear there are of different approaches are used which can be useful in our analysis including:

1. **Sector** in which games are used;
2. **Issues** they address, particularly focused on the needs and challenges of particular target groups;
3. **Ways and Means** that these issues are addressed by digital game-based approaches;
4. **Type of game genre** or technical configuration used.

This report examines the use of digital games using the first three approaches. In Chapter 3, the broader serious games market is examined in terms of **sectors**. Section 2.10 explores three alternative **ways or means** of addressing using with games, using the taxonomy of Special-purpose games, COTS and Game Making. Section 2.11 also reports on the uptake of 'serious games' according to sector as this is the form data is available. In this current chapter there is a focus on the **issues.** This report does not explicitly explore the use of different genres, such as role playing or simulations, or specific platforms and technical configurations, although these are addressed on a case by case basis.

This report finds that action in the area of DGEI is focused on three main focuses of activity in game development and use related to social inclusion and empowerment:

1. **Support for disengaged and disadvantaged learners and enhancing employability and integration into society**.
2. **Promotion of health and well-being.**
3. **Fostering of civic participation, awareness and community-building.**

The following description of activities and outcomes will be structured around these three themes, surveying the landscape, exploring particular cases of game use, and identifying particular sub-issues and target groups.

Cutting across these domains, the study finds that there are three main **ways and means** of using digital games:

- **Special-purpose digital games:** Digital games developed specifically for learning and participation focusing on a particular issue and target group.
- **Commercial off-the-shelf games**: Learning and participation through COTS digital games that were not specifically developed for this purpose, generally entertainment games.
- **Digital game co-creation**: Learning and participation by making digital games.

These are sufficiently different in approach, stakeholders involved, and potential for policy support that they warrant separate examination. All three modes of game use are found in the three areas of action, though with few examples game-making to promote wellness. The particular benefits and drawbacks of each of the three means of using games are explored in Section 2.11.

2.4 A survey of digital games for empowerment and inclusion

This section surveys the landscape of game use according to the themes identified above and in related areas of education, health and community to provide the context in which the specific social inclusion and empowerment uses are bring developed. The survey includes both established uses of digital games and more experimental examples, so as a result some are unproven in outcomes. Reference to evidence of impact found in the literature is given where available. Due to the fragmentary nature of current applications, and the vast diversity, this classification is not systematic or complete, and covers both types of use and settings of use. However, we suggest that this selection is rather representative, and shows that the area with most activity is around education and training of young people, and the disabled. Some of the practices could also be considered to fit into other categories – for example digital games in active aging may have elements of coping with health, and improving physical wellness, but can also be about direct empowerment more directly, though engagement with the 'youthful' practices of digital gaming.

This discussion is primarily intended to demonstrate the scope of activity in the field, the aims of use of games, and target groups addressed in current practice.

19 IMAGINE (Increasing Mainstreaming of Games In Learning Policies) projects aimed at mainstreaming digital games in education policy http://imaginegames.mdrprojects.com/

20 See http://www.gameclassification.com/EN/index.html an online database of over 38000 games (Oct 2012) sorted according to a classification developed by Julian Alvarez and Damien Djaouti, in association with researchers from I.R.I.T. and L.A.R.A. laboratories at Toulouse Universities II & III. .

2.4.1 Support for disengaged and disadvantaged learners and enhancement of employability and integration into society.

A core set of issues in social inclusion are associated with exclusion from employment, related to educational failure and low 'employability' in young people, exclusion of migrants with poor language skills and lack of understanding of host society, and older people with inappropriate skills and low employability. These groups face issues of discrimination (age, race, youth etc), and structural factors such as lack of jobs or suitable training opportunities and other services. We find digital game-based approaches being designed and used to address all these issues and groups.

First there are games and practices aimed at supporting disengaged and disadvantaged learners and enhancing employability and integration into society. This is probably the largest area of activity. Generally these games-approaches target young people, as part of the sorts of actions typically used to address NEETs: prevention of school drop out and underachievement, and reinsertion into education and training, or supporting the transition to work with employability training (Eurofound 2012). Problems associated with these groups include lack of skills, lack of self-confidence and self-efficacy, and disengagement from formal education, so game-based practices try to use games in ways that both use the qualities of games (explored in Section 2.9), and the use of games as an 'alternative', motivating approach that reaches out to the interests and culture of these young people. These young people can also struggle to enter adult life in other ways: attempts to support adult behaviour are included here and in the section of participation.

However it must be stressed that there are links between cognitive disability and the exclusion of young people from education and work (Eurofound 2012).

Most of the activities addressing these issues fall into the area of **formal and informal education**, particularly aimed at younger people of school age or in training for work. Key investments in development and use have also been made by the military, particularly in the US, for recruiting and training recruits who tend to be young people, sometimes with low education attainment, and in more advanced training in the use of equipment, tactics, strategy and medicine.

Games used in education aim to stimulate learning in the stricter sense aiming to convey knowledge and improve skills. In a school context, they can involve both classroom and home usage. The range of subjects covered by games used in education is broad and can be linked to certain subjects such as history, mathematics, foreign languages, biology, etc. (Wastiau, Kearney, & Van den Berghe, 2009). It is important to note that games in education generally do not aim to replace but rather to complement traditional course materials by providing interactive ways to engage with content or to exercise.

Commercial off-the-shelf games have been proven to be a helpful tool in an educational context, containing intellectual challenge and content (Van Eck, 2006; Charsky & Mims, 2008). Commercial games such as **Civilization** (MicroProse) used in an educational context, have proven to increase civic knowledge and civic engagement, which could work empowering and stimulating people to take part in society. Different commercial off-the-shelf games have also been a useful tool in motivating foreign language learning (Wastiau,

Table 5: Support for disengaged and disadvantaged learners and enhancing employability and integration into society: aims and populations

Issues addressed by particular Game-based practice	Target groups
Ensuring educational success in formal education Educational success through Informal education for school age children Re-integration of young people in to education and training (dropouts and NEETs) Youth integration into adult life Enabling parents and families to better support young people Adult education and employability Engaging and integrating disabled people in mainstream society Accessible Gaming for disabled Migrant integration	Children at risk of education failure and dropout NEETs Young people un-prepared for adult life Disabled people exclude form workforce and mainstream cultural activities Migrants struggling to integrate in employment and society

The second main set of practices is around other groups excluded from employment and society. Two groups stand out – disabled people (with physical disabilities or cognitive disabilities such as autism, ADHD etc) who are partly excluded from employment, education and from playing games alone or with peers; and migrants with low language skills or understanding of the host society and culture.

Kearney, & Van den Berghe, 2009), such as **Zoo Tycoon** (Big Fish Games), **Nintendogs** (Nintendo), **Civilization** (MicroProse) and **The Sims** (EA). In the UK, the Reading Agency found a range of COTS games could be used in child and adult literacy training including **Professor Layton and the Curious Village** (Nintendo DS) (Clarke and Treagust 2010). Several studies have tested both special-purpose

games and COTS to attain the same goal, such as brain training (Green & Bavelier, 2008; Miller & Robertson 2011) and language learning (De Grove, Van Looy &Mechant, 2011). This approach has received considerable attention over the last 10 years, with initiatives at European (such as **Engage Learning**) and national level (such as the Scottish **Consularium** programme) attempting to develop classroom use of COTS.

Knowledge transfer is not always the primary goal of games in education, as they can also aim to raise awareness about subjects such as opportunities in the professional market, juridical and social rights, poverty, etc. Moreover, educational games for raising awareness aim to empower their audience by guiding their future choices. There are a whole range of games aimed at raising awareness of complex issues, often designed to be used in schools (see also section on Games for civic participation). Raising awareness about juridical and social rights (**Olympe** by 3D DUO), for example, could be empowering for groups at risk of exclusion and presents them with the opportunity to become more independent and help them in taking control of their own lives by making them aware of what they are entitled to. Another empowering example is the location-based game initiative **No Credit, Game Over!**[21] (Eurowheels). This is a digital city game that covers the topic of financial debt, crisis situations and sustainable consumption. This game targets young people who live in the margins of society and are the first who will feel the consequences of economic depression and are thus at risk of exclusion. No credit, Game over! aims to teach both financial and media literacy to this particular target group. Finally, games such as **Kompany** (Ouat Entertainment) and **Infinity** (Crossroads digital media) provide information about job opportunities in different industries and what competences are needed. This broadens the player's horizon in terms of job opportunities and helps them to take seize these opportunities.

Outside of conventional formal education, there are a whole range of game uses in non-formal and informal learning. Some involve special purpose games, such as **Back 2 Your Future** game environment to help school dropouts back into education developed by ITpreneurs and van der Boorbut. However more often it is game-playing and game-making type initiatives that are being used to engage young people, though after-school clubs, video-game competitions (**Nottingham Game League**), workshops (**Gamestar(t**)), and alternative education (**LearnPlay** and **Aarhus College**). Adult literacy has also been tackled though videogame, both special purpose games, such as the German **Winterfest** or **iChance,** and though the use of COTS entertainment games that stimulate reading (Clarke & Treagust, 2010).

Games-based approaches have also been developed for educational support of people with special needs, for example young people with with Autism, **(ispectrum),** dyslexia (**DYS**), or visual impairment (**My first day at work**). Disabled young people are also helped to integrate into their peer-groups in education by being able to play video games on an equal footing. The

Making IT personal project, initiated by young people, helps social integration of students with learning difficulties allowing them to play video games with peers, while the **Special Effects** service adapts video games to be played by people with physical disabilities.

It is not only in the education sector that digital games are being developed and used to in relation to education and training for work. Employability and reinsertion into education can be seen in the context of broader use of games-based approaches by corporate and industry sectors, where games can be used to offer training to employees, to attract or inform potential employees. Games designed for professional training aim at the development and maintenance of a professional activity or of competences needed in a certain professional industry. They target both managers and employees and cover general skills, subjects such as safety and sector-specific competences. U&I Learning for example have a serious game product for Audi factories to deliver safety training to the workforce many of whom are migrants without a common language.

Existing games in this domain cover a variety of skills for a variety of target groups. They are developed to enable engineers to check their competences (**EDF** by Real Fusio) or teach a new software (cfr. supra), to exercise courtroom skills when studying law (**Houthoff Buruma The Game** by Ranj Serious games), to teach the basics of stock and options trading (**Darwin Survival of the Fittest** by Ameritrade games) etc. Games aimed towards managers mainly deal with management skills, covering subjects such as human resources (**Entretien de Recadrage, Entretien Annuel** and more by ITycom) how to manage environmental issues in a business (**Energy-Wise** by PIXELearning), successfully guiding an agenda through a variety of increasingly complex meetings (**Virtual leader** by SimuLearn), etc. Finally, games for professional training can also aim at raising awareness about an issue. **Diversité** (Daesign) for example treats the subject of diversity and non-discrimination. The aim of this game is to train managers in making decisions exclusively based on competence criteria.

In recent years employers have started using digital games for generating interest among young job candidates and enhancing employees' skills (Sitzmann, 2011). L'Oreal group are one of the highest profile employers to go down this route, with the **Reveal** business game[22] developed by TMPNEO.[23] Hotel Group Marriot International for example, has launched

21 http://www.ew32.be/featured/no-credit-game-over/

22 http://www.reveal-thegame.com/

23 http://www.tmp.com/upload/library/2780_L'Oreal_Reveal_Case-Study_2010-04-07_APPROVED.pdf

Facebook game **My Marriot Hotel** (developer unknown) in 2011 to recruit new employees. Employment agency Kelly Services created **Kelly's Second Life** (Linden Labs) to enable job seekers to work in a variety of virtual jobs that mirror some of Kelly's career opportunities (Entertainment Software Association, 2011).

Canon U.S.A. has developed a game to train new copier technicians and to teach them copy machine repair by dragging and dropping parts into the right spot on a copier (Sitzmann, 2011). Cold Stone Creamery issued **Stone City** (Persuasive Games) to train employees in customer service, speed of service, accuracy in portion sizes and correct recipe recognition. With a higher profile**, eSmart** is a € 2.2m training tool for Macdonald's employees developed by Nintendo on the Nintendo DS aimed at cutting training time in half for part time works in Japanese restaurants.[32] These games focus more on low-level training within companies, in employment and employability services, making them highly relevant in the context of social inclusion and empowerment.

More examples are given in the tables below (Table 5, Table 7, Table 8). Examples in bold are described in more detail in the original cases studies presented in the next section,

Table 6: Supporting disengaged and disadvantaged learners and enhancing employability and integration into society: Part 1 – Youth in transition

Issue	Example	Approach
Re-integration of young people in to education and training (dropouts and NEETs)	**LABlearning[24] at Aarhus college (DK and EU), a redesign of vocational training in health and social care around game making to prevent dropout from vocational education**	Making/Special/ COTS
	Nottingham e-Games League[25] (UK) to attract young people (14-19) into a learning environment using digital games as an 'eSport'.	COTS/Making
	LearnPlay Foundation[26] (UK) supporting engagement into vocational education, using games and games-based technologies, based on 10 years of game-based employability training.	COTS/Making
	Back 2 Your Future[27] (NL) game environment to help school dropouts back into education	Special
Youth integration into adult life	**In-living[28] (UK) game for housing associations to help to teach young people about being a 'good tenant'**	Special
	Rock 'n' High Roller[29] (UK) Game for Financial Planning in 18-24 Year Olds	Special
	Footfall[30] (UK), a Facebook game to help young people learn financial responsibility and issues involved in setting up a small business, funded by broadcaster Channel 4	Special
	TARDIS project[31] (EU) to improve interview skills of young people with low employability	Special
	No Credit, Game Over! (BE) – location based game run in a certain time and place to help young people learn about debt	Special

24 http://www.sosuaarhus-international.com/LABlearning.htm

25 http://www.nottinghamschools.co.uk/eduweb/sites/egames-template.aspx?id=978

26 http://www.learnplayfoundation.com/about/

27 http://www.b2yf.org/ (Website no longer available)

28 http://www.inliving.co.uk/

29 http://www.caspianlearning.co.uk/customer-resources/serious-games-case-studies.htm

30 http://preloaded.com/games/footfall/

31 http://tardis.lip6.fr/

32 SERIOUS GAMES MARKET blog MAY 8, 2010 http://seriousgamesmarket.blogspot.com.es/2010/05/nintendo-gets-serious-about-serious.html (accessed 11-2012)

Table 7: Supporting disengaged and disadvantaged learners and enhancing employability and integration into society: Part 2 - Youth in education and at home		
Issue	Example	Approach
Ensuring educational success in formal education	**Consolarium[33], (UK) 5 year programme to integrating COTS into schools in Scotland to support generative learning for all abilities and ages. See also a video describing primary school use of Nintendo DS[34]**	COTS
	Scratch[35]: MIT developed tool to engage children in learning by making games and animation. Used in 1000s of schools and homes worldwide. (see also Microsoft Kodu[36])	Making
	Digital Games in schools guidebook[37] – European Schoolnet developed resource from 2009	COTS/Special/Making
	Education Arcade[38] Project to develop online game medium for learning science and maths (US) and many more.	Special
	Games Learning Society (GLS) – Civilization & CivWorld[39]. Modified version of the popular world building/strategy game for use in classrooms teaching geography and history	COTS
	Institute of Play[40] re-design of lessons, curricula and schools around play, supported by digital tools incl mobile games. (USA)	Making/Special/COTS
	Gamestar Mechanic[41], commercial game-based platform and curriculum that teaches youth (ages 8 – 14) how to design video games to foster systems thinking, 21st Century skill building and creating a powerful motivation for STEM.	Making/Special
Improving Informal education for school age children	**Gamestar(t)[42]** (ES) – game-making based workshops for engagement in education;	Making
	Girl Game Workshop: (DK)) ethnic minority young people expression through game design	Making
	Intel Computer Clubhouse[43] – network of 100 out-of-school learning clubs where young people from underserved communities explore their own ideas, develop skills, and build confidence in themselves through the use of technology	Making
Helping parents and families	**What Should We Tell The Children?[44]** (UK) A sexual health communication tool to help parents discuss difficult or embarrassing issues with their children	Special

33 http://www.ltscotland.org.uk/usingglowandict/gamesbasedlearning/consolarium.asp

34 http://www.heppell.net/bva/bva5/elrick.htm

35 http://scratch.mit.edu/ and http://scratched.media.mit.edu/

36 http://fuse.microsoft.com/page/kodu

37 http://games.eun.org/

38 http://education.mit.edu/blogs/louisa/2012/pressrelease

39 http://www.gameslearningsociety.org

40 http://www.instituteofplay.org/

41 http://elinemedia.com/products/

42 http://arsgames.net/blog/?cat=395

43 http://www.computerclubhouse.org/

44 http://playgen.com/portfolio/sexualhealth/

Table 8: Supporting disengaged and disadvantaged learners and enhancing employability and integration into society: Part 3 - Work and play		
Issue	Example	Approach
Engaging and integrating disabled people in mainstream society	**ispectrum[45]:** (EU) developing games to improve the work-based social interaction skills of people with Autism. Follow up is ASC-Inclusion	Special
	DYS[46] – 800 training games for dyslexic young adults for developing vocational skills	Special
	My first day at work[47] (ES) game for integration of workers with slight cognitive disabilities or visual impairment	Special
	Making IT personal[48] (UK) social integration of students with learning difficulties by playing video games with peers.	COTS
Accessible Gaming for disabled (young) people	**Special Effect[49]** (UK) adapts video games to allow young people with disabilities to enjoy the computer games that their contemporaries play. Includes videogame directory and visitors centre www.gamebase.info.	COTS
Adult education and employability	**Winterfest[50]** (DE) Digital game for adult literacy	Special
	Reading Challenge[51] (UK) A gaming framework for encouraging and helping adults with low literacy to develop and improve their reading skills	COTS
	iChance[52] (DE)– aid adult literacy using Nintendo DS based games and learning by playing	COTS
Employer provided training for work	**eSmart[53]** training tool for Macdonald's employees developed by Nintendo on the Nintendo DS	Special
Migrant integration	**Thuis in Nederlands[54]** (NL) short game and virtual world to support a commercial programme preparing migrants for the naturalisation exam	Special
	Mixopolis[55] (DE) Vocational orientation & participation for young migrants	Special

45 http://ispectrum.eu/

46 http://www.dys2.org/

47 http://www.inredis.es/

48 http://www.makingitpersonal.org.uk/

49 http://www.specialeffect.org.uk/

50 http://www.lernspiel-winterfest.de/

51 http://playgen.com/portfolio/reading-challenge/

52 http://www.profi.ichance.de/index.php?id=50

53 http://www.ubergizmo.com/2010/04/video-of-mcdonalds-nintendo-dsi-training/ for a video of the game in action.

54 http://www.thuisinnederlands.nl/home/

55 http://www.schatz-der-kulturen.de/

2.4.2 Promoting health and wellbeing

In the public health, health and wellness domains, games are generally being designed and deployed in the context of health prevention and assistance to chronic illness sufferers. Uses include raising awareness about certain physical and mental health issues as part of public health communication; promotion of general health and well-being and/or supporting those that are dealing with specific health problems such as stress, depression, ADHD, diabetes, obesity and even cancer. From the earliest days of digital games, end users themselves used virtual text-based online games or Multi-User Domains (MUDs) for self empowerment (Turkle, 1995), and more recently researchers, social work and medical practitioners have explored more extensively the therapeutic value of games, and online games in particular (Freddolino and Blaschke, 2008). This research has attempted to sort out the positive and negative effects of playing games: on the positive side, the sociality and development of social networks, and the opportunity to explore identity, to exercise, and just have fun; on the negative side, internet addiction, anxiety, bullying etc (Young 2009; Freddolino and Blaschke, 2008).

The value of playing entertainment games has been supplemented by attempts to create special purpose games and gamification that targets wellness and health-favouring behaviour. Some of these games are well documented cases, using mainly experimental design to test effectiveness of these games. The military has been a key driver in this domain, investing in game approach for training professionals and for rehabilitation of military personnel with physical (including brain) injuries, and mental health problems. The domain has sufficient maturity that now meta-reviews of experiments are available for certain conditions and interventions, especially psychotherapy (Attila Ceranoglu 2010; Wilkinson et al 2008). There has been a concentration of development of game-approaches for children, targeting asthma, obesity and other diseases (Thai et al 2009). A key sector of the population with specific health and wellness issues are the elderly, and in contrast to many of the other uses of games, games-based practices have been developed focused on helping people stay well as they age, and encouraging wellness, and social participation among the elderly who start to suffer the inactivity and isolation characteristic of old age.

Examples include games that raise awareness about depression **(Elude** by Singapore MIT), drugs (**Divo's Buzz** by Ranj Serious games), smoking (**Rex Ronan** by Super Nintendo Entertainment System), HIV (**Life Challenge** by New York State Department of Health) and promoting awareness of the dangers of a heart attack (**Heart Sense** by University of Pennsylvania, 2004).

Table 9: Issues and target groups in the promotion of health and well-being

Issues addressed	Target Groups
Rehabilitation from Acute physical illness	Military personnel
Raising awareness and coping with chronic physical conditions	People with chronic condition such as diabetes or asthma
Coping with mental and cognitive conditions	Depression sufferers
	Young people with ADHD
Active Aging including cognitive, physical stimulation, and social participation through games.	Older people with reduced mobility and suffering isolation

Initiatives addressing older people include the **Third Age Computer Fun Clubs** in Scotland, which introduce older people to computers, with an emphasis on playing games as a way to stay active. Studies of use of the **Wii-fit** exercise games, with the easily accessible controllers, as a way of providing physical exercises have instead found that it is the social and mental benefits of participation and feeling 'up to date' that are most striking (Wollersheim et al 2011; Rosenberg D, et al 2010). These undermine the idea that older people do not want to play games and cannot benefit from doing so. Indeed Nimrod (2011), in a study of online communities of elderly people found playing games was their principal activity.

Table 10: Promoting health and well-being: Part 1 – Illness and wellness

Use domain	Example	Approach
Rehabilitation and coping with illness	**Mundo de Estrellas**[56] (ES) **and Starbright World**[57] **(US): Virtual worlds for children and young people in hospital or with serious illnesses**	Special
	Pain Squad Mobile App[58] (CA) gamified online mobile app to encourage children in hospital to record pain levels	Special
	Re-Mission[59], (US) a free video game for youth with cancer, to induce positive health behaviours to support successful, long-term treatment outcomes, tested with a randomized, controlled study (Hope Foundation[60])	Special
	Use of Nintendo Wii and WiiFit in rehabilitation, Games4Rehab[61] (US)	COTS
Coping with and preventing chronic physical conditions	***Gluciweb***[62] (FR) Games to learn about managing diabetes, including **L'affaire Birman** and Healthseeker a facebook game to learn how to cope with Diabeties	Special
	Back in Play[63](EU), a European Public health campaign on ankylosing spondylitis	Special
	Quest for the Code[64], **Asthma Kids (CA)** and **Kids with Asthma (AU)** games to help children cope with Asthma	Special
	Hope also developed **Zamzee**, an activity meter and motivational website to increase physical activity among children to reduce risk factors associated with heart disease and diabetes rates	Special
Coping with Mental health and cognitive problems	Use of games to reduce psychological problems of military personnel and engage their families in motivation (Family of Heros)[65] (US)	Special
	SuperBetter[66] (US), online game by McGonigal to designed to boost physical, mental, emotional and social resilience	Special
	Elude[67] by Singapore MIT tackles depression	Special
	SPARX[68] (NZ) A cognitive behavioural therapy based computer game for young people with depression.	Special
	R.O.G.E.R.[69] (US) Prototype game dedicated to patients who suffer from a lack of logic and organizational skills using the Microsoft Kinect controller	Special
	Wii in therapy for Down Syndrome children (US)	COTS/Special

56 http://www.mundodeestrellas.es/

57 http://www.starbrightworld.org/

58 http://www.campaignpage.ca/sickkidsapp/

59 http://www.hopelab.org/

60 http://www.hopelab.org/

61 http://wiihabilitationresearch.blogspot.com/ ; Wuang et al (2011) http://www.ncbi.nlm.nih.gov/pubmed/21071171; http://www.games4rehab.org/userpage.php?page_id=15

62 http://www.gluciweb.com/

63 http://eu.back-in-play.com/

64 http://asthma.starlight.org/

65 http://www.gamesforchange.org/play/family-of-heroes/

66 https://www.superbetter.com/

67 http://gambit.mit.edu/loadgame/elude.php

68 http://www.bmj.com/podcast/2012/04/27/sparx-and-spirometry

69 http://blog.fishingcactus.com/index.php/2010/10/07/fishing-cactus-presents-r-o-g-e-r-the-first-medical-kinect-serious-game/

2.4.3 Fostering of civic participation, awareness and community-building

Digital games are being used to inform or communicate with the general public and specific target groups dealing with topics such as culture, ecology, business, humanitarian affairs, politics and government. This is with the aim of changing attitudes and perhaps behaviour in consumption, community and promoting civic and political engagement (Kahne et al 2008). Social exclusion does not only have to be tackled by individuals suffering exclusion, but by addressing attitudes and actions of the communities they live and work in. Some of these games focus specifically on issues such as racism and extremism, and aim to build understanding and tolerance. It seems games are selected as tools (along with other interactive social media) as a powerful way to communicate with young people. While some of the games are designed to raise awareness and stimulate discussion, others are designed to bring people together around tasks – to produce social change, or at least plans for change.

Table 11: Promoting health and well-being: Part 2 - Active aging		
Use domain	**Example**	**Approach**
"Active Aging"	**Third Age Computer Fun**[70] (UK) Club for older people to learn about computers and play online games, including non-english speaking migrants	COTS
	Studies on **exergaming in social integration of elderly** in Australia[71] and US[72] that promote mental health and wellbeing.	COTS
	GameUp[73] **(EU) –** Experimental Motivational and exercise games for elderly person mobility, using movement sensors (2012)	Special
	Nintendo's 'Brain Training' (and some research[74])	COTS and Special
	Online games as focus of fun for older people online community online communities[75]	COTS
	Heart Sense[76], an early (2004) health intervention game by the University of Pennsylvania aimed at helping people recognise symptoms of heart disease	Special

70 http://www.thirdagecf.org.uk/about.htm

71 Wollersheim et al (2011) http://www.swinburne.edu.au/hosting/ijets/journal/V8N2/pdf/Article%202%20Wollersheim%20et%20al.PDF

72 Rosenberg D, et al (2010). http://www.ncbi.nlm.nih.gov/pubmed/20173423

73 http://www.itfunk.org/docs/prosjekter/AAL-GameUp.htm

74 http://www.sharpbrains.com/blog/2012/01/13/research-does-nintendo-brain-age-work-as-a-brain-training-game/

75 Nimrod G.((2011) http://www.ncbi.nlm.nih.gov/pubmed/21030471

76 http://www.acasa.upenn.edu/heartsense

Table 12: Issues and populations related to fostering of civic participation, awareness and community-building	
Issues addressed	**Target Groups**
Civic engagement and participation Social Entrepreneurship and Development Tackling social issues of concern to youth people	Young people living in communities with high crime rates Young people with low Entrepreneurs in developing countries Citizens excluded from political and civic participation Communities and workplaces with problems of racism, and other equity issues

Some of these games explicitly target civic engagement (Kahne et al 2008). For instance, **Community Planit**[77] (Engagement Game Lab), a location-based game that that supports participatory community planning bringing people together through game play to think about how to improve their own community. This type of approach is being taken by UN Habitat agency in **Block by Block**, using the online sand-box game Minecraft in which the local environment can be modelled and reshaped by citizens. The online game **Spent**[78] developed for the Urban Ministries of Durham raises players awareness of poverty deploying game techniques in a game that cannot be won, illustrating the poverty trap.

Games targeting specific communities have include special purpose games like **PING** and **Choices and Voices,** which are taken into schools to be used in class to raise awareness of particular topics, or **Soul Control**, an example of game making and participative design a game. This game was originally developed by young people living in an area with high knife crime, and subsequently turned into media tool that was successful used in London to reduce knife crime.

A game approach was also attempted by the **World Bank** (World Bank Institute (WBI) and infoDev), with the **Evoke** project designed by gamification guru and design, Jane McGonigal which links English speaking entrepreneurs around Africa with mentors in the USA in 12 week 'seasons' to develop creative solutions to problems such as food security, energy, water security using a game-format with challenges (Quests) given out every week. 19,386 people registered as players and over 6000 completed one challenge, although only 142 people completed all quests (Gaible & Dabla, 2010).[79]

The social services organisation, the **Cook Inlet Tribal Council** in Alaska has taken the strategic step of investing in a game-develop programme, though its social enterprise arm as a way of engaging young native Alaskans, by creating commercial entertainment games that reinforce traditional Alaskan cultural values of Interdependence, Resiliency, Accountability and Respect., using images and traditional stories retold in the contemporary format of the videogame. The aim is to strengthen self-esteem and identity, promote equity and social justice, and also help provide educational and employment prospects though videogames.[80]

77 http://www.communityplanit.org/

78 http://playspent.org/

79 http://blogs.worldbank.org/edutech/evoke-reflections-results-from-the-world-banks-on-line-educational-game-part-2

80 http://www.euclidnetwork.eu/files/Bilbao_with_notes_FINAL.pdf

Table 13: Fostering civic participation, awareness, and community-building		
Use domain	**Example**	**Approach**
Civic engagement	**Playspent**[81] (US) raising Poverty awareness, game funded by a church charity in USA	Special
	America 2049[82]**,** a 12-week-long Facebook-based game –"educate players on global issues including discrimination based on race and sexual orientation, immigration, labor and religious freedom. "	Special
	ENERCITIES[83] (EU) Environmental awareness game funded by Intelligent Energy	Special
	Block by Block[84] UN Habitat, Monjang and FryeUK project to involve youth in the planning process in urban areas in developing countries using the Minecraft sandbox. Builds on similar Mina Kvarter' project with the Swedish Building Services Agency	COTS
	Community Planit[85] (US) online game to involve Detroit citizens in city planning	Special
	Cook Inlet Tribal Council [86] programme to engage Alaska Native youth promote skills associated with Alaska Native culture and develop local game industry. (with e-Line Media[87]),	Special/COTS
Social Entrepreneurship and Development	**Evoke**[88] ('Africa' and US) World Bank funded multi-user online game to develop social entrepreneurs in Sub-Saharan Africa	Special
Tackling social issues of concern to youth people	**Soul Control**[89] (UK) a youth created 3D computer game about the dangers of knife crime subsequently turned into a professional product Video and game	Making/ Special
	Choices & Voices[90]**: (UK) A simulation encouraging young people to explore and discuss issues underlying violent extremism**	Special
	The Skillz[91] (DE) learning game for intercultural competences of young people in craft training	Special
	PING[92] **(EU) a game to raise awareness about poverty and social exclusion among adolescents**	Special

81 http://playspent.org/

82 http://america2049.com/

83 http://www.enercities.eu/

84 http://www.mojang.com/2012/09/mojang-and-un-presents-block-by-block/

85 http://www.communityplanit.org

86 http://www.euclidnetwork.eu/files/Bilbao_with_notes_FINAL.pdf

87 http://elinemedia.com/

88 http://www.urgentevoke.com/

89 http://www.rollingsound.co.uk/soul-control-dead-ends/

90 http://playgen.com/play/

91 http://www.the-skillz.de/

92 http://www.povertyisnotagame.com/

2.4.4 Summary

There is a wide range of activities in the field of digital games for empowerment and inclusion, addressing many issues and target groups of relevance to policy. Some of this work has well established, dating back at least 10 years, but a great deal is very new, established since 2010. This high level of interest and investment suggests that practitioners, researchers, designers and funders are identifying benefits and opportunities, and sufficient experience has been developed to facilitate this degree of activity. Table 14 summarises the issues and target groups addressed. Across these games, young people stand out as the most important target group, reflecting the familiarity of young people with the game mode, and is likely to reflect the skewed investment into targeting young people with games-based approaches, with less attention played to how games can also reach other age groups.

Table 14: Issues and target groups addressed by current game-based practice

Issues address by games	Sub-issues	Groups addressed by interventions
Support for disengaged and disadvantaged learners and enhancing employability and integration into society	Ensuring educational success in formal education Educational success through Informal education for school age children Re-integration of young people in to education and training (dropouts and NEETs) Adult education and employability Engaging and integrating disabled people in mainstream society Accessible Gaming for people with disabilities Migrant integration Helping parents and families Youth integration into adult life	Children and young people at risk of education failure and dropout NEETs Young people un-prepared for adult life Disabled people exclude from workforce and mainstream cultural activities Migrants struggling to integrate in employment and society
Promotion of health and well-being	Rehabilitation from Acute physical illness Raising awareness and coping with chronic physical conditions Coping with mental and cognitive conditions Active Aging including cognitive, physical stimulation, and social participation through games.	Military personnel People with chronic condition such as diabetes Depression sufferers Young people with ADHD Older people with reduced mobility and suffering isolation
Fostering of civic participation, awareness and community-building	Civic engagement Social Entrepreneurship and Development Tackling social issues of concern to youth people	Young people living in communities with high crime rates or levels of radicalisation Entrepreneurs in developing countries Citizens excluded from political participation Communities and workplaces with problems of racism, and other equity issues

In terms of levels and types of game use, the diversity and activity is greatest in education and employability, with COTS and game-making both suited to the face-to-face nature of much formal and informal education. In the other domains there are more examples of the use of special-purpose game-based products and services, often with the aim of reaching a large audience online, or are targeting a very particular issues

There is a large diversity of inclusion intermediaries and sponsoring organisations involved in this work, from individual teachers and schools to education ministries; NGOs working in poverty prevention; disabled rights campaigners and services; researchers and practitioners in health and public health; policy makers in local, regional, national and international administrations; NGOs and public services supporting NEETs and migrants, and the military. Game designers, from the video game industry and the 'serious' game sector, such as elearning have contributed to development, though with exception of Nintendo, activity is mostly from smaller development studios and individual designers.

2.5 Evidence of outcomes in the research literature

While the preceding sections demonstrate significant activity in the use of games, it is important to find out what the outcomes and impacts of this activity really are. Unfortunately, research that specifically addresses the impact for at-risk populations is rare: the interventions are often not planned to be evaluated, there is no budget for experimental or quasi-experimental impact studies and in the context of social inclusion interventions, it is very difficult to separate out different causal pathways when there are multiple problems and multiple interventions, and the situation creates ethical issues in research design. However, when we broaden the scope, we can see that there is research that has explored the relationship between digital game play on the one hand, and civic engagement, health and well-being, and employability on the other hand. Nonetheless, despite positive results being used observed in practice, research-based evidence, particularly using experimental techniques, is thin on the ground and equivocal. This is partly explained by the difficulties of evaluating this type of intervention. There is a considerable among of research still underway, as the use of digital games is expanded, evaluation techniques are developed and experience of long term outcome accumulated. This section gives an impression of some of the research results available.

2.5.1 Supporting disengaged and disadvantaged learners, and enhancing employability and integration into society

Evidence relevant to these issues is mostly situated in the field of education. The theoretical and research background for understanding the way games work in learning is addressed in section 2.9. Here evidence is available in two areas: language learning and professional training.

Language learning

An area that shows promise for the use of digital games is language learning. De Grove, Van Looy and Mechant (2011) explored game experience and perceived learning among adults playing games for **language learning, but comparing** two special-purpose games and one commercial point-and-click adventure game. While initial results show that the commercial game fostered a more positive game experience and higher perceived passive learning than the educational games leading to the observation that production value is a strong predictor of learning experience. However, differences in perceived learning and game experience disappeared when gaming frequency was held constant, which suggests that non-game specific factors are responsible for the variation that was found.

Professional training

A meta-analysis by Sitzmann (2011) evaluated the effectiveness of computer-based simulation games used for professional training comparing data from 65 samples including over 6000 trainees. The study showed that declarative knowledge, procedural knowledge, retention and self-efficacy were higher in the simulation game group in comparison to the control group (Sitzmann, 2011). It also showed that learning was higher when participants interacted with the learning material rather than having it explained to them via text or audio. Learning work-related competencies was also higher when trainees could play as many times as they desired. A third determinant that led to an increase in work-related competencies was the integration of the game in an instructional programme. It is important to note that in her study, Sitzmann found that published studies reported higher effectiveness than unpublished studies, which is in line with a publication bias for reporting positive research outcomes.

2.5.2 Promoting health and well-being

A number of different mechanisms have been explored in digital games for Health and wellbeing. While in some areas of behavioural change there are increasingly numbers of studies for example, published in the journal Games for Health[93] or specific journals such as Gerontology, in other areas evidence is still weak. A key problem is also in the design of the studies: there have not been enough studies to cumulatively develop expertise in the research community. Cultural factors and various in the game design make research design and comparison difficult.

93 http://www.liebertpub.com/g4h

Attitudinal and behavioural changes

Experimental design has been used in the **health sector** to assess effects on attitudes and behaviour. Most research in this area shows positive relationships between playing specially designed games to support behaviour change and an actual change in behaviour or attitude. Games to stimulate healthy eating amongst children and adolescents, for example, show a higher fruit and vegetable intake (Baranowski et al., 2008). Games stimulating medication intake (Olivera, Cherubini & Oliver, 2010) and disease management in general also showed significant differences between the experimental and control groups (Lieberman, 2000).

Improving cognitive abilities

A study conducted amongst elderly compared an action video game and a game especially aimed at improving cognitive abilities (Boot et al., 2012), with respondents playing one of the two games for 60 hours over a period of three months. Games used were the action video game Mario Kart (Nintendo) and the brain fitness game Brain Age 2 (Nintendo). Results showed that the action video game had no effect on perceptual and cognitive abilities. The effects of the brain fitness game were also minor. Furthermore, the participants who played Mario Kart found less enjoyment in playing the game compared to those who played the brain fitness game. Boot et al. (2012) suggested that in further research game preference should be taken into account.

Skill training in simulated environments

Many digital games allow the player to navigate and communicate with each other in a virtual environment. The anonymous nature of these environments is believed to make the players feel more equal to the other people present in the virtual environment, allowing them to overcome barriers that otherwise would occur in the real world (McComas, Pivic & Laflamme, 1998). In virtual environments immediate feedback can be given (Rizzo et al., 1998), which is also a general characteristic of games (Clark, 2007: Baranowski et al., 2008). Another useful element is that the virtual environment can be 'paused' to make room for discussion and give some extra information (Rizzo et al., 1998). For those with disabilities, simulation can afford a sense of independence and control (McComas, Pivic & Laflamme, 1998).

In experiment with adolescents who have a learning **disability** (Cromby et al., 1996), one group of adolescents first practiced a shopping task in a simulated environment, while another did the same in an actual shop. After practicing, the former group needed significantly less time to pick up a list of products in an actual shop and put more correct items in their cart than the latter group. The authors warn that to create an effective simulation, a balanced level of detail is required. When too much detail is integrated, the participant may not be able to generalize it to other settings. However, enough detail should be included so that the participant can actually practice the skills and use them in real-life settings.

2.5.3 Fostering civic participation, awareness and community-building:

Various studies suggested a positive link between being able to function in a game as a political actor and getting experience with simulations of political systems on the one hand and civic engagement on the other hand. For example Kahne, Middaugh & Evans (2008) survey of adolescents in the USA published as the *The Gaming and Civic Engagement Survey of Teens/Parents* found a positive relationship between game play and civic engagement. However, this type of (cross-sectional) research cannot prove a causal link. Neys, Van Looy, De Grove and Jansz (2012) explored at the medium-term effects of playing Poverty Is Not a Game (PING) on civic engagement and which found that particularly in the area of social facilitation, the game was successful (see Annex 1). Qualitative game based learning research, often reframes the question of impact to understand how use of a digital games changes classroom and learning dynamics. Squire and Barab (2004), studying the use of the commercial game Civilization 3 in a school found that once the children discovered they could explore power dynamics and reverse history, they became more engaged to learn about basic geographical and historical facts they had no prior knowledge of.

2.6 Original empirical evidence: methodology and aim

From this overview of uses of digital games we can move to original empirical data collected for the DGEI study and specific examples of how digital games and digital game practice has been developed and are currently being used to deliver positive outcomes. The approach of this study was not only to understand the outcomes of game use, but to understand the socio-technical processes involved in shaping the technology, products and interventions (Williams and Edge 1996), the actors involved, and the social learning processes that brought these actors together to create novel, but effective interventions (Williams et al, 2005), so the method was design to capture these features. Two sets of cases were collected: First, 7 cases complied by IBBT/iMinds researchers focusing on specific single-game projects, exploring the outcomes and processes and challenges of development. A second set of cases focused not on individual game-cases, but are examples of efforts, often initiated or involving policy makers, to make structural change in the use of DGEI, or develop large scale and systematic practice. These were selected from different European countries, again with criteria of diversity of actors, targets and approaches. These cases were written by external experts, and include the initiators and champions of some of the cases themselves. This enables the voices of these people to be expressed more directly in this study. The

full contributions are available as an addition Annex report of the DGEI study on the IPTS website.

A multi-modal search for examples of the use and development of digital games produced a list of examples of current practice, much of which has been presented in the tables above. The practices were categorised, and a selection made of particular examples to profile. Two sets of cases were made. The first set of cases is documented in detail in the State of Play report (Bleumers et al 2012) are a set of seven cases focused on a particular game products. These explore the game, its use and impact, and how it was created, with short critical assessment. The cases were collected and assessed online, via research papers and interviews with key respondents. Selection was on the basis of **Application domain**, availability of **Documentation** on the design, business model; the **Constituency of stakeholders** involved in development and use**; Documentation of impact** including preferably some form of **formal assessment**, and the degree of **innovation**, such that the cases illustrate cutting edge practice Within the given selection criteria, cases were selected so as to obtain sufficient variation in terms of: **Initiating actors**: including end users, inclusion practitioners, research or commercial business; diversity of **Game play design**; **Hardware platforms used**, and **Region**, including European and non-European cases

The cases are presented in the following tables, highlighting the Issues addressed; Actions taken; the target groups; the outcomes; and a description of how the initiative was undertaken.

Table 15: Good practices in supporting disengaged and disadvantaged learners and enhancing employability and integration into society					
Name	**Challenge**	**Population addressed**	**Action**	**Reported outcomes**	**How it was achieved**
InLiving (UK)	Young people unable to cope with being a tenant in their own home resulting in high costs of failed tenancies in social housing	Young people age 16-25	A Social Housing association provides training in budgeting, personal care and interpersonal skills to help young people become successful tenants through training supported by a specially designed role-playing game used on a mobile phone that enables users to learn at their own pace.	Potential outcomes include more competent and responsible young tenants. Actual outcomes include financial benefits of reducing failed tenancy costs and increasing effectiveness of service delivery.	Partnership between Housing Association and game development firm. Game was licensed to user organisations, but the developers went bankrupt.
Games Learning Society (GLS) – Civilization & CivWorld (English speaking)	Low educational achievement through conventional teaching and learning	All learners, especially disengaged and disadvantaged learners	Teachers use a popular commercial game where players build a civilisation, modified for use in class and at home that allows students to improve their knowledge about history and geography, through critical discussion and other activities around game playing activities.	Students 'feel smarter' and experience a strong sense of accomplishment while having fun, Improvements in factual and conceptual knowledge	A team and community of researchers and enthusiast teachers worked to develop modifications and teacher support material and good practice, Not supported by original game developers. Now superseded by more recent games.
Aarhus Social and Healthcare College, Denmark	Low employability of target group; High dropout rates from vocational training (40%)	Disengaged and disadvantaged young people post-school age. Esp. deprived, migrants backgrounds	Aarhus Social and Healthcare College (DK) introduce game design and designers into classroom work where students learn through making games related to topics of social and health care in order to support re-entry to mainstream education.	Re- engagement in learning, building self-confidence Developing transferable game development skills Encourage entrepreneurial mindset Reduced dropout from course and insertion into conventional education	10 year programme of experimentation, results in a large scale project of structural redesign of vocational training in health and social care around game making by Aarhus Social and Healthcare College (DK and EU) This is now being scaled up with EC grant LabLeanring.

Name	Challenge	Population addressed	Action	Reported outcomes	How it was achieved
LearnPlay Foundation and 3dNative (UK)	Low employability of target group High dropout from conventional vocational training.	Disengaged and disadvantaged young people post-school age.	LearnPlay runs face-to-face courses on employability use game making, which makes students enthusiastic about learning maths, physics, programming and design. Approach as also been used in old people's home and community projects. A programme of vocational education aimed using the same approach aims to prepare young people for work in the video game industry (200 learners).	Observations showed that participants were Engaged in learning by building self-confidence and esteem Improved employability skills Game-related design and technology skills. This effectively meant very low dropout rates For 170 people taking the course.	Learnplay built bridges between the digital game industry and the education system and developed curricula and support infrastructure to support the use of digital games-based approaches based on 10 years of employability training, and community engagement. Competitive funding from public agencies (including EU Social Fund). The 19 Project employability course reached 175 young people, and cost 100k GBP. 6000 people were reached in community regeneration programmes.
Gamestar mechanic (US, worldwide)	Low literacy levels, and engagement with science and technology by school children	Middle school age children, especially disengaged and disadvantaged learners	A online game that allows students to play, design and publish various games in learning basic literacy, science, technology and maths, and '21st century skills' such as problem solving, solution oriented reflection. 120.000 children are making use of the platform and so far, they have created over 100.000 games (mid-2011)	Children learning problem solving skills and game design. At-risk children, who encountered difficulties with regards to general literacy and reading, also developed strategic thinking and problem solving strategies.	Researchers and a foundation developed the game. This was financially unsustainable in the long term, and the project has been transferred to a commercial company eLine Media and licensed as a Freemium service.
Consolarium(UK)	Failure of formal education support all learners	All students, especially from deprived backgrounds	Teachers employ COTS games such as Dr Kawashima's Brain Training, Nintendogs, Guitar Hero, and Mario Kart, Village in the classroom, using consoles and handhelds – own, borrowed or brought in by children. This forms the basis of a Generative teaching approach. Critical game studies and game making has also become an established part of the national curriculum.	Increased engagement. Improved outcomes Controlled experiment with Dr. Kawashima's Brain Training, measured maths competence for low and mid-ability children increasingly significantly.	(UK) 5 year programme to integrating COTS into schools in Scotland to support generative learning for all abilities and ages, by supporting teachers though demonstration, impact research, lending equipment and developing shared good practice

Table 16: Good practices in fostering civic participation, awareness, and community-building					
Name	**Issue**	**Target group**	**Description**	**Reported Outcomes**	**How it was achieved**
Poverty Is Not A Game (PING) (EU)	Low awareness and understanding of complex issue of poverty	Teenage school students 13-16	A 3D adventure browser game and teacher kit was developed and distributed (online and CD) to schools across Europe. This was used in class by teachers to help raise awareness of poverty and social exclusion issues	In formal evaluation, children were engaged in class, and measures of Political interest, civic engagement and political participation increased after game use and over 3 months.	Funded by a number of foundations, games developers, researchers, schools and poverty organisations worked together to produce a game that would engage users, and study impact of use.
Choices and Voices (UK)	Extremism and social exclusion in local community	School age students living in areas with problems of social exclusion and extremism	By motivating discussion through interactive role-play based scenarios, children explore different viewpoints on issues like social exclusion, bullying or violent behaviour, and discuss this in class.	No evaluation of impact, but approach engages children in topic	Initiated by a regional Police Services and funded by Education Authorities, Interior ministry, Local Government. An SME specialising in games for social inclusion (Playgen) developed a game that was distributed for free to over 600 schools.

Table 17: Good practices promoting health and well-being					
Name	**Issue**	**Target group**	**Description**	**Recorded and claimed outcomes**	
At-Risk for University Faculty	High incidence of mental health and suicide risk among students	Students with mental health difficulties	As pat of broader support to university staff, an online role playing game was developed to help them identify and refer students that are experiencing psychological and mental distress.	A study found that referral of students showing signs of mental distress, increased on average by 109%	The Mental Health Association of New York City and Kognito Interactive, an SME developer of online role-playing developed a commercial product that is now licenced of over 100 universities in the US, Canada, UK and Australia, plan to reach 20000 high schools by 2014
Starbright	Pain, isolation and low self-esteem of children in hospital	Children with serious medical conditions and their siblings, aged 13 to 20	Facilaite health and wellness of children with serious medical conditions through social network with games, enabling these children to express themselves and exchange with others about their illness, fears and feelings.	Formal evaluations found: Reduction in pain, anxiety, loneliness and withdrawn behaviour. Improved self-efficacy and self-esteem, increased communication, socialization and peer support	The Starbright Foundation receives grants form major industries to install and run the system in hospitals. Vivendi and AOL funded the updating of the system to include online social media and games. Available in English, French and Spanish
These cases are far from comprehensive in coverage, and the reported outcomes only depend on a scientific study in a few cases. However they provide a focus to the broad set of evidence to be presented in the next chapters.					

2.7 Game-focused case studies

In this section, each case is presented in a short form. These are summaries of the longer cases presented in the DGEI *State of Play* report (Bleumers et al 2012). The cases present the aims and implementation of each project, including those involved, and the game-approach developed. The outcomes are discussed, including a critical view on the quality of evidence. Finally, lessons learnt are suggested, covering issues such as value of game-based approach, business case, and impact assessment methodology.

2.7.1 Poverty Is not a game (PING)

Type of game practice	**Awareness raising** though a specially made game
Date of publication	October 20, 2010
Client and support	King Baudouin Foundation (Belgium) Institute for Broadband Technology (Belgium) Calouste Gulbenkian Foundation (Portugal/UK) Network of European Foundations Bernheim Foundation (Belgium) Robert Bosch Foundation (Germany)
Target Groups	Teenage school students 14-16.
Project objectives	Raising the awareness of teenagers on poverty and social exclusion issues
Distribution and adoption	No budget allocated. Free, online or physical, distributed and translated by project partners. Guidance material for schools to support adoption. 5000 learning packages distributed. The website received 30.347 unique visitors, from the 15th of October 2010 until the 13th of January 2012
Use context	In classroom home use, or other, Children age 13-16, individual, group use with teacher guidance
Designer(s)/Editor(s)	GriN Multimedia, independent SME, Belgium, www.grin.be
Location and Language	Europe, 5 European Languages
Development	1 year, collaborative project,
Costs	EUR 200,000 (excluding project management, research, testing, launch and marketing which were carried out by partner organizations)
Business model	Foundational grant, free of charge to schools and end users
Game details	3D adventure single player game for browser, developed on Unity 3D
Website	www.povertyisnotagame.com

AIM and IMPLEMENTATION

The central aim of PING is to raise awareness about poverty and social exclusion among adolescents. It is an adventure game in a three-dimensional city environment with two separate scenarios which aim to raise consciousness about the mechanisms underlying poverty. It was specifically developed for use in the classroom and thus playable in the time span of one lesson period. PING offers a basis for a class discussion, because it treats a complex social issue which would perhaps be more difficult when discussed using more traditional teaching method'.

PING was developed in the context of the European year against combating poverty and social inclusion in 2010. The King Baudouin Foundation (BE) and the Institute for Broadband Technology, IBBT (BE) were the initiators of the project. For testing and feedback conducted with **poverty organizations and schools** (both pupils and teachers). **School principals** and **teachers** are involved to the use of PING in schools and the classroom, a teachers' toolkit was developed to 'introduce teachers to digital games as possible educational resources (Kearney 2010).

Research shows that the game was perceived as fun, and children reported high perceived learning. The game appeared to work differently in classroom and home use situations.

OUTCOMES

Affective gaming and perceived learning were measured (De Grove et al, 2010). Female pupils responded more positively to the game than male pupils. **Political interest, civic engagement and political participation** were also measured after playing and after 3 months. 76% of surveyed users reported talking to friends about the topic, and 18.2% reported find out more about poverty over the 3 months (Neys et al 2012)

LEARNING:

- Importance of documentation for intermediaries (teachers) on how to implement the game
- Added value of making a game compatible with the context of use
- Impact of how the game is labelled on the perception and expectations of its users
- Importance of ensuring an enjoyable game experience
- Several ways of impact assessment (game distribution, website visits, measures of game experience, perceived learning, civic engagement, political interest and participation).

2.7.2 InLiving

Type of game practice	Support to integration into society though a specially made game
Date of publication	2008
Client and support	Kirklees Neighbourhood Housing Funding 50% by Creative North Studios Funding by Kirklees Neighbourhood Housing. Funding by Innovation Exchange and the Next Practice Program of Third Sector in the Cabinet Office.
Target Group	Young people age 16-25 becoming tenants of housing association
Objectives	Effectively engaging with, and promoting sustainable tenancies amongst young people
Distribution and adoption	Distributed by Housing association, was part of formal tenancy support.
Use context	Independent use by young people but integrated in training courses and local municipality housing strategy
Designer(s)/Editor(s)	Creative North Studios, UK, SME developer of Development of mobile games and apps www.creativenorth.co.uk and Grass Roots Learning
Location and Language	UK, English
Development Costs	£40,000
Business model	Free of charge to end users, but licences to municipalities and housing associations
Game details	Role-playing game (“The Sim’s’’ style) build according to scenario-based learning principles, running on Java-enabled mobile phones
Website	http://www.inliving.co.uk/

AIM and IMPMENTATION

InLiving is a mobile phone based tenancy training game that is offered to young people as part of training and support to become tenants. The game was commissioned by Kirklees Neighbourhood Housing organization who noticed that most youngsters lacked the basic insights and understandings of the difficulties and challenges that go hand in hand with tenancy, which led to the idea of developing a mobile phone game as a way to possible way to reach and engage young people.[94] The central aim is to raise awareness amongst young people about the different risks and challenges that are associated with independent living. The main starting point of the game is to give the user a virtual experience as a first-time tenant, but with limited resources and limited skills. As such, the game aims to empower young people to move towards viable tenancies in real life. Concretely, skills such as budgeting, personal care and interpersonal skills are developed.

InLiving is a role-playing game build according to scenario-based learning principles. Subsequently, the game guides users throughout eight different scenarios related to tenancy management, education and work, affordable credit and loan sharks, financial planning, home contents insurance, unwanted visitors and healthy eating. All available scenarios are based on real-life experiences of local tenants. The pedagogy of the game is based on the idea of gamification. The different scenarios contain many of the topics that are also covered within formal courses. As such, the game is an excellent way of delivering key information for those who do not participate in formal education. It allows young people to learn by playing in an engaging way. The in-game questionnaire system enables users to test and improve their knowledge as it gives extensive feedback on incorrect answers.

The game was initially used in several local schools as a learning tool for Personal, Social and Health Education (PSHE), included in a course for tenants called, a course named 'A Place of Your Own', incorporated into Homelessness strategy 2011-2014 developed by the Dartford Borough Council (2011) and subsequently launched in various social housing organizations in other areas of the UK.[95] (Kirklees Business News, 2009).

OUTCOMES

The potential impact of InLiving is expressed in terms of (1) inclusion and empowerment goals – e.g. reengaging young people; (2) learning goals – e.g. hands-on pre-tenancy training; and (3) financial benefits – e.g. reducing failed tenancy costs and increasing effectiveness of service delivery. Initial figures indicate that successful **tenancies** have increased by 10% after the integration of the game into the support package of Kirklees Neighbourhood Housing. However, few figures are available about the effective impact of the game.

LEARNING

This case illustrates:

- How game aesthetic and platform can be successfully matched to the target audience (e.g. mobile phone-based for youth (at-risk));
- The value of a participatory approach in which intermediary organizations and target audience are involved in the design of the game; it ensures the game is matched to its audience and serves as an empowering experience in itself;
- The value of embedding a game in an more comprehensive support structure; by integrating it in formal and informal support organizations chances at reaching, teaching and thus empowering target audience are increased;
- Relevance of game updates based on user feedback and input from intermediaries.

94 Thorpe, C. (2008). Role play route to getting a roof over your head. Inside Housing. co.uk http://www.insidehousing.co.uk/role-play-route-to-getting-a-roof-over-your-head/6500070.article

95 Kirklees Business News. (2009). Mobile homes! Retrieved from: http://issuu.com/huddersfield/docs/kirklees_ferbuary2009#download

2.7.3 At-risk for University Faculty

Type of game practice	Support to wellness, though a specially made game
Date of publication	2009
Client/Market	Aimed at universities and schools in the US.
Objectives	Creation of an online interactive gatekeeper training program to enable university staff members to identify and refer students in psychological and mental distress
Distribution and adoption	Accessible via the Internet 24/7 and continuously keep track of the progress of individual users. At-Risk made available by integrated in suicide prevention programs. Available in US public organisations and over 100 universities in the US, Canada, UK and Australia, plan to reach 20000 high schools by 2014
Use context	Training gatekeepers in education as part of local strategic plans and services to address suicide in education
Designer(s)/Editor(s)	Kognito Interactive, SME developer of online role-playing simulations and games, UK http://www.kognito.com Mental Health Association of New York City
Location and Language	UK/US English
Development Costs	N/A Commercial investment
Business model	Yearly, institution-wide license. Annual license pricing begins at $3.250.
Game details	Online role-playing simulations and scenarios, customizable to different user contexts
Website	http://www.kognito.com/products/faculty

AIM and IMPLEMENTATION

At-Risk for University Faculty is an online interactive gatekeeper-training program, targeted at university faculty staff members. The central aim is to help faculty members identify and refer students that are experiencing psychological and mental distress, based on the idea these people are the preferred counsellors in a situation like this because of their privileged, standardized and long-term based contact with students (Shaughnessy, 2009; Issac et al 2009). As such, the game indirectly focuses on decreasing the number of suicides amongst university students. Kognito Interactive developed the At-Risk game in 2008 in partnership with the Mental Health Association of New York City and other experts (American Foundation for Suicide Prevention, 2009) to tackle high levels of depression and distress among students. At-Risk games are virtual online role-playing games that simulate conversations with students that might experience mental distress such as bipolar disorder, borderline personality disorder, depression or eating disorder. They are avatar-based learning games situated in a virtual classroom or office in which the user assumes the role of a faculty member, fellow student or high school teacher. The game itself consists of a 45-minute online training that enables users to examine the common indicators of psychological distress and to discover suited methods for approaching an at-risk student for referral to the counselling centre (Kognito Interactive, 2009a). The built-in progress and assessment tools allow for a personalized approach and a decrease in the learning curve thanks to elaborate and customized feedback

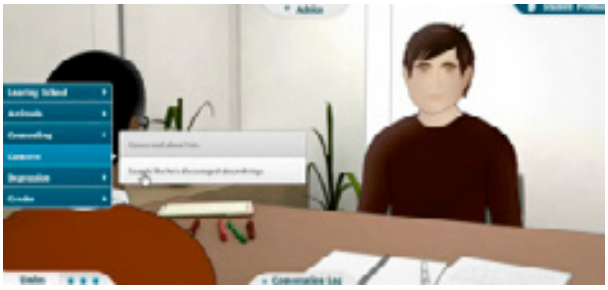
OUTCOMES

The evaluation study shows that the use of the game increases the likelihood that faculty staff will approach, and refer at-risk students. After implementation of the At-Risk game, referral of students showing signs of mental distress, increased on average by 109%. This impact is obtained when use is integrated in a larger strategic university plan to identify and support at-risk students. These impact data have, however, been criticized because of the unreliable sample size of the impact studies (Heeter, 2009).

LEARNING

- Need to integrate game use in a wider strategic organizational plan
- Customizability of the game and game-related resources (e.g. game-related website, promotion material) can enable relevance within the local context of use
- Built-in progress and assessment tools allow for a personalized approach and an increase in the learning curve thanks to elaborated and customized feedback
- Top-down/push approach focusing on access is problematic, as it does not guarantee usage
- Limited play time may hinder achieving sustainable feedback and learning

2.7.4 Choices and Voices



Type of game practice	Support to **community participation**, and **integration into society** though a specially made game
Date of publication	2008
Client/Market	Police Services Education Authorities UK Home offices, **local authorities** and the **Local Government Association funded**
Target Groups	Young people living in areas with problems of social exclusion and extremism
Objectives	Motivate young people to explore and discuss the underlying issues that might lead to tense situations and extreme violence.
Distribution and adoption	**Provided free to schools,** Web-based and offline, more than 600 schools, over 60.000 users are potentially reached.
Use context	**Secondary schools** located in the UK: schoolchildren between 12 and 18 year old. accompanied by the **toolkit for teachers, and advice on combating extremism**
Designer(s)/Editor(s)	PlayGen, SME Developer of serious games and gamification apps and simulations, specialising in social inclusion. UK http://Playgen.com West Midlands Police Department Avon & Somerset Constabulary University of Birmingham Department for Children, Schools and Families
Location and Language	UK, English
Development Costs	N/A
Business model	Grant funded
Game details	**Customisable interactive simulation game on PC, adapted to low-spec computers, with focus on aesthetic design**
Website	http://www.choicesandvoices.com/

AIM and IMPLEMENTATION

Choices and Voices is an **online interactive simulation game** developed to prevent violent extremism and enhance community cohesion among children. It aims to engage more effectively with young people from various social backgrounds in order to counter or reflect on issues like social exclusion, bullying or violent behaviour. Based on two short interactive role-play based scenarios, children explore different viewpoints followed by structured class discussions. Each scenario is divided into a series of actions and scenes. The user decides upon actions to be taken and is faced with a number of moral dilemmas (Memarzia & Star, 2011). Throughout the game, four key messages and themes are addressed, namely (1) peer pressure; (2) social exclusion and isolation; (3) bullying, humiliation and exposure to violence; and (4) feelings of underachievement and lack of respect. It implemented in schools, where have been identified as central bridging points between children and society; and as central points through which local communities can be reached (ACPO, 2010).

PlayGen developed the game and teacher guide over a six-month period involving different stakeholders such as the West Midlands Counter Terrorism Unit of West Midland police, the Birmingham University's School of Education, the Department of Children Schools and Families (DCSF) and a number of regional schools (PlayGen, 2010). These extensive partnerships were set-up to ensure that the game was developed in line with the educational national curricula and the Department for Children, Schools and Families' national strategy. Choices and Voices was designed to be customisable to the local context, and three version were made: Choices and Voices for West Midlands, Choices and Voices for Southwest and Choices and Voices for Primary

OUTCOMES

Memarzia and Star (2011) and Davies (2011) have conducted studies in which the **experience and perceived usefulness** of Choices and Voices was evaluated, but there is little formal evaluation of longer term outcomes.

LEARNING

- Integration in existing initiatives (in this case educational curricula, policy strategies) and possibility for customization can broaden the audience that is reached through a game;
- Guided and contextualized use of a game increases its chance of being successful and documentation is crucial to enable effective facilitation documentation;
- Importance of multi-stakeholder approach in which different stakeholders' needs are heard and expectations carefully managed;
- Lack of budget for and planning of impact assessment compromises measurement of sustainable impact.

2.7.5 Starbright World

Type of game practice	Support to **health and wellness,** and **disadvantaged learners** though a specially made game
Date of publication	1996/2006
Client/Market	N/A The Foundation receives funding from a large number of major industries inc. Vivendi and AOL.
Target Group	Children (13-20) in hospital and at home and their families
Objectives	Creation of a social network for children with serious medical conditions and their siblings, aged 13 to 20 enabling these children to express themselves and exchange with others about their illness, fears and feelings.
Distribution and adoption	Online, and available anywhere, but restricted
Use context	Hospitalised children and their families have access as part of range of support services provided by the Starbright Foundation
Designer(s)/Editor(s)	Starlight Children's Foundation, Non-profit organization with aim of Improve quality of life for children with chronic and life-threatening medical condition through entertainment, education and family activities.http://www.starlight.org/ with Worlds, Inc, Schematic, Userplane
Location and Language	US and Canada, additional affiliations in Australia, Japan and UK, English, French and Spanish
Development Costs	Unknown by 2006 version received donations of over $625.000 form whole system
Business model	Free to use, foundation funded
Game details	Multifunction Online social network with online multiplayer games
Website	http://www.starbrightworld.org

AIM and IMPLEMENTATION

The 2006 version of Starbright World is an online portal, conceptualized as virtual hangout exclusively for teens with serious medical conditions and their siblings, aged 13 to 20. It addresses the problems that seriously ill children experience physical and emotional isolation and have difficulties to engage in long-term relations with other teens in their immediate social environment. It is an **online social network** which enables users to connect, share information, and support each other. It was founded by Hollywood personalities and major corporations. In 2009, thanks to a grant from Vivendi, social networking technologies were added to the platform (Starlight Children's Foundation, n.d.). As such, Starbright World now contains several applications such as moderated chat rooms, games, bulletin boards, videos, e-cards and personal profiles. The main aim of the platform is to provide support and to distract seriously ill youngsters from their daily struggles. Users can choose amongst five pages: (1) Connect; (2) My life; (3) The latest; (4) Games: and (5) Videos. Each of these sections was created with a specific goal. In order to stimulate interactivity between users, the platform provides access to a high number of multiple player games such as Battleship or Connect Four in the 'Games' section. In addition, the 'Videos' page allows users to share all kinds of multimedia projects they want to showcase.

OUTCOMES

The Starlight Children's Foundation commissioned several studies on the actual impact of the Starbright World program, both the 1996 and 2006 versions. Most of these studies were realized by way of qualitative research methods and the results demonstrate the added value of Starbright World in terms of reduction in pain, anxiety, loneliness and withdrawn behaviour. Recent studies demonstrate additional benefits such as improved self-efficacy and self-esteem, reduced pain, increased communication, socialization and peer support, and an improved ability amongst young people to cope with their illness. (Cashin & Witt, 2010). However, results on impact need to be approached critically. It is hard to attribute causality to such a complex intervention (Bush et al. 2002; Eysenbach et al. 2004)) for people with many different ages and conditions (Hazzard et al. 2002). Nonetheless, the range and seriousness of different studies

clearly indicate the potential long-term contribution of the Starbright World program for the social inclusion and empowerment of hospitalized children.

LEARNING

- Added value of extensive collaboration with intermediary organizations; this ensures target users are being reached;
- Alignment with target users' diverse needs through an integrated platform solution (combining game play with other features) enhances the benefits of a game-based approach for the target audience;
- Recognition of the value of a project can be facilitated by academic research addressing the project's role and impact and can then help to secure further funding so that the project can be deployed on an even wider scale.

2.7.6 Games Learning Society (GLS) – Civilization and CivWorld

Type of game practice	Support to (**disengaged and disadvantaged) learners** though COTS
Date of publication	Original release 1991 – many subsequent releases.
Client/Market	N/A
Target Groups	School age children, especially disengaged learners
Objectives	Games Learning Society (GLS) aim was to enable the use of Civilization or CivWorld to learning academic content, game design or civic engagement by way of custom-designed game scenarios, curricula, case studies and teachers support tools,
Distribution and adoption	Commercial and now Facebook game. (Civworld is freemium game) No addition promotion needed. GLS focuses on teachers and communities of teachers in particular. No figures on use.
Use context	In home and out of home – in classroom with teacher support
Designer(s)/Editor(s)	Firaxis (Sid Meier), Commercial Game developer, http://www.firaxis.com GSL (Games Learning Society, University of Wisconsin-Madison, Kurt Squire) Take-Two Interactive Software, Inc.
Location and Language	Worldwide/US English
Development Costs	N/A
Business model	N/A
Game details	PC game, now Facebook version
Website	http://www.gameslearningsociety.org, http://www.firaxis.com

AIM and IMPLEMENTATION

Civilization is a **multiplayer strategy game** that consists of creating one's own civilization by managing resources, military, engineering, and diplomacy. Each player represents a nation and competes with other player-nations to rule the world. Other players can join the game, hence creating various civilizations (Pack, 2011). Players represent a variety of individuals such as farmers, manual workers, merchants or artists and have to win battles, share technological inventions, form a government, win elections or influence the (financial) market in order to advance in the game (Reilly, 2009; Tanner, 2011). **CivWorld** is the **Facebook version** of this game and shows a more simplified game play, lower barriers to entry and a more social component All Civilization games do aim to stimulate progressive learning by using in-game rewards and a just-one-more-turn approach in their game design. As such, players feel smarter and experience a strong sense of accomplishment while having fun.

Games Learning Society (GLS) is a group of academics, game developers and private stakeholders that aim to understand and investigate the learning characteristics of Commercial Off-The-Shelf (COTS) games and ways to integrate COTS games into educational programs and curricula. Civilization is one of the games that GLS has been looking at extensively in 2005 and 2006. Though Firaxis, the developer of Civilization, did not want to be explicitly linked to GLS and the idea of using Civilization for learning purposes, they did provide GLS the necessary working versions of the game. In 2009, the funding for the GLS Civilization project was terminated and work moved to other game platforms (World of Warcraft in particular). GLS developed different teacher's guides and set up an online community on how to use Civilization in a classroom setting.

OUTCOMES

Main focus of use of Civilisation is in knowledge acquisition with regards to history and geography (Squire, DeVane, & Dugra, 2008). It is suggested that Civilization allows students

to improve their factual and conceptual knowledge about history and geography; learning that is facilitated by letting students situate their game experience in a broader context through classroom discussions or specific non-game oriented activities (Lee & Probert, 2010). The impact of the Civilization game with regards to inclusion and empowerment is fourfold. First, the use of the game in a formal learning context leads to an increase in the **motivation** of disinterested students. Second, playing the game can enhance **self-confidence**, as players learn indirectly by play and experience knowledge acquisition while playing. The open-ended game play provides a tool to test presumable geopolitical outcomes and it gives the player a moderating role (Burns, 2002). Third, the **individual and collective contribution** to the development of scenarios enables a sense of empowerment. And four, experiencing some kind of belonging to a social community and an increase in social interactions, enhances social integration or inclusion.

Little information is available about the use of Civilization for teaching game design. No figures are available on the actual uptake of Civilization or CivWorld for learning purposes. As learning is not one of the main usage goals of Firaxis, there is no in-game assessment system of learning built into the game itself.

LEARNING

- This case illustrates that approaches making use of COTS (commercial-of-the-shelf games):
- Bring to the fore the learning that already takes place in well-designed commercial games and the communities of practice that emerge around them;
- Can capitalize on existing publishing strategies that have successfully created a wide player base;
- Need to address representation bias in commercial games, hence, guidance into critically addressing such bias is crucial;
- May be faced with a mismatch between the level of challenge presented by the game and skills possessed by its target audience; game play may turn out too challenging for those seeking to implement or use it, both teachers and children.

2.7.7 Gamestar Mechanic

Type of game practice	Support to (**disengaged and disadvantaged) learners** though game making
Date of publication	2010
Client/Market	MacArthur Foundation, the Institute of Play
Target groups	8 to 14 year olds;
Objectives	Enhance 21st literacy skills by way of empowering youth through game design.
Distribution and adoption	Freemium – free to use online, subscription for addition features. Marketed to individual teachers via presence in online teacher communities. Not extensively marketed to consumer market. Over 2,500 schools worldwide are using the game. Approximately 120,000 children are making use of the platform and so far, they have created over 100,000 games that have been played 1.5 million times
Use context	Currently used in school, after-school programs, community centres or libraries. The game is mainly used during Technology Education classes. 60% school, 40% home use.
Designer(s)/Editor(s)	Initially developed by Gamelab, and Academic Advanced Distributed Learning Co-Lab (AADL),[96] University of Wisconsin-Madison. Currently under management of E-line media, a small publisher of game-based learning products and services, US e-line Media[97] and the Institute of Play (Chaplin 2010).
Location and Language	World-wide/Use English
Development Costs	Approx US$1m
Business model	Gamelab developers went out of business. Basic online version available for free. Monthly subscription fee for additional features (Premium Account): 5.95$/month.
Game details	Browser based game to play and design various games.
Website	http://gamestarmechanic.com/

AIM and IMPLEMENTATION

The idea for the development of Gamestar Mechanic grew out of an academic research paper by Gee and Zimmerman (co-founder of Gamelab), and reflected on the added learning value of game design and suggested that a game in which the game play was based on designing new games, would allow for a learning process with regards to (1) systems thinking; (2) iterative design; (3) collaboration and knowledge exchange; (4) problem solving; and (5) digital literacies.

It is used widely in schools and by home users, and is sold by targeting individual teachers through online teacher communities in order to avoid the necessary approval by umbrella institutions or the various school district levels.

Gamestar Mechanic is an online, browser-based game that allows players to play and design various games. It consists of three components: (1) quests – e.g. various games that indirectly transfer knowledge on the principles of game design; (2) a player workshop – e.g. a game designer/creation tool; and (3) a game alley – e.g. an online community in which players can publish their own games, but also rate and play games of other players. The game aims to increase the acquisition of **21st century literacy skills** such as problem solving, solution oriented reflection or basic digital literacy skills, and increase participation in Science, Technology, Engineering, and Mathematics (STEM) learning.

96 http://www.academiccolab.org/

97 http://elinemedia.com/

OUTCOMES

Research by Games (2009) indicates that children in middle school develop **language and literacy skills** by playing Gamestar Mechanic. Most knowledge however is developed with regards to **game design**. By playing Gamestar Mechanic, children get an in-depth view of the pragmatics, language and semantics of game design. The study also confirms that Gamestar Mechanic helps children to unravel problems and develop strategies to address them. Though the number of respondents was limited in Games' study, a large number of children from **at-risk background** were involved. The findings suggest that learning through game based learning environments or approaches could be a **possible way to re-engage at-risk children**. The study showed that the at-risk children, who encountered difficulties with regards to general literacy and reading, also **developed strategic thinking and problem solving strategies**.

LEARNING

- Game design as a pathway for young people to inclusion and empowerment; through game making they can acquire problem solving, system thinking and literacy skills that can be used in various contexts;
- Uptake of games by intermediaries can be encouraged by being present at offline and online venues for intermediaries, keeping cost low, making access and usage of games convenient (browser-based) and easy and providing support for implementation;
- Effective publishing conducted by a commercial company.

2.8 Multi-initiative and policy-focused cases

A number of leading experts and practitioners were asked to describe a particular experience in their own countries, focusing on digital game programmes that sought systemic change, at an institutional, regional or national level, and addressing the role of policy in these programmes. Several of the pieces were contributed by key actors in the initiatives. These contributions are available in the DGEI Annex 3, and are summarised here.

The first two cases address evidence for government intervention at national and regional levels in Europe. Illona Buchem describes the situation in Germany, where national and regional ministries in education, social affairs and youth have funded the development and application of digital games to address social inclusion issues. In France, Jean Menu describes the role of the Ministry of Industry in recognising and supporting the general video game industry, and Ministry of Digital Economy investment in kick-starting the 'serious game' industry, followed by regional initiatives. These cases are included in the section on Policy (Section 3:10)

The third case again focuses on an initiative run and financed by the education department of the Scottish Government. This illustrated both outcomes in the classroom, and systematic attempt to mainstream the use of COTS cases in all schools in the country. A key problem in developing the widespread use of digital-game based approaches (without mandating use) is how to support and encourage a diverse set of professionals across a region to overcome scepticism and lack of knowledge and equipment, and put this in to practice This example, contributed by Derek Robertson shows how this was achieved in the Scottish school education system.

The final two cases look at bottom up examples of the development and use of digital game practices that have been developed over 10 years, in Denmark (Jan Gejel) and the UK (Stephen Hands). Both focus on power of digital game-based techniques to reengage young people in education, especially in situations when existing approaches have failed. The cases both turn young people's engagement with video games into approaches based on **creative game-making,** emphasising the change of attitude and motivate that can be achieved, the soft skills develop and use of game making to develop a range of design and technology skills too. These cases highlight a **number of policy challenges to the systematic development and use of game-based approaches.**

2.8.1 Game-based learning in Scottish schools: The story of the Consolarium Initiative

Derek Robertson, Education Scotland, National Advisor for Emerging Technologies and Learning Derek.Robertson@educationscotland.gov.uk

Type of game practice	Support to (**disengaged and disadvantaged) learners through COTS use**
Date of action	2006-
Client/Market/Users	Schools and Teachers in Scotland
Target groups	Primary and Secondary age children in mainstream public schools
Objectives	Enable the integration of commercial entertainment games in classroom learning activities to boost learning outcomes across Scotland.
Distribution and adoption	Demonstrator centre the 'Consolarium', online support network, library of games and equipment
Use context	In class use of computer games, support for home use.
Designer(s)/Editor(s)	Education Scotland, Scottish Government
Location and Language	Scotland (UK), English
Development Costs	10 000 GBP + National Advisor
Business model	Part of National Education budget, with School and local education budgets.
Game Details	Using console and handheld games in the class with school and children's own devices. Games used include Dr Kawashima's Brain Training, Nintendogs, Guitar Hero, Mario Kart, Eyepet and Professor Layton & the Curious Village
Website	http://www.educationscotland.gov.uk/usingglowandict/gamesbasedlearning/consolarium.asp

AIM AND IMPLEMENTATION

Spreading the use of digital games is a significant challenge for policy. Derek Robertson, an ex-teacher and games-based learning researcher was appointed National Development officer to do just that in the context of formal education, and reached schools and teachers in every area of Scotland, supporting the integration of commercial entertainment games in classroom learning activities.

The Scottish Government has a commitment to investing in and exploring how the use of contemporary digital technologies can play a major part in helping to enhance and enrich learning in schools. One of the investments made in this regard was an initiative that has run from 2006, designed to explore the potential and the practical application of game-based learning in teaching and learning was established. A National Development officer post was created to explore, nurture, support and develop the pedagogical application of game based learning for learners of all abilities and dispositions in Nursery, Primary and Secondary schools.

With an initial budget of £10,000 a project called The Consolarium: The Scottish Centre for Games and Learning was initiated. Consolarium was set-up within the office of Learning and Teaching Scotland (now part of Education Scotland). This space was furnished with an interactive whiteboard and all the commercially available games consoles at the time. It acted as a National resource in terms of providing a venue where Local Authority Education mangers concerned with technologies and learning could visit and try out a range of resources within the guided framework of options and offers for partnership projects to support contexts for learning within Curriculum for Excellence in their own educational settings. This enabled the Education Scotland to:

- Explore the range of games technologies available and in doing so practically and theoretically inform and influence curriculum development for the 21st century;
- Provide a space where teachers and others involved in education can visit and get hands-on access to these resources;
- Encourage teachers and educators to engage with the debate about the place of such technology in their class, school or local authority;
- Reflect on how 'out of school' learning can be encouraged and maximized;

- Develop relationships with local authority, academic and industry partners to extend, and refine effective and innovative practice with computer games.

The initial call for partners from Local Authorities in Scotland in 2006 received 5 notes of interest from the 32 partners within Scotland. After two years the Consolarium had visited and/or initiated projects in each of the 32 Local Authorities in Scotland. Many of our projects that used commercial available computer games such as Dr Kawashima's Brain Training, Nintendogs, Guitar Hero, Mario Kart, Eyepet and Professor Layton & the Curious Village resulted in very positive feedback and observations from pupils, teachers, education managers and parents as well as strong research and documentary evidence to add further weight to what was being reported.

The Consolarium is temporarily unavailable due to relocation, but an online community of practice and central lending service is still in place, and responded to 150 requests for loans in the 2011-2012 academic year.

OUTCOMES:

- Uptake and Use: Increased uptake of game based learning practice across Scotland;
- Appropriation: The discourse around game based learning changed from people asking why should we be using games in school to how can we be using games in school;
- Curriculum inclusion: Games and contexts for learning with games referred to as valid educational resources and also included in the definition of what a text is in Curriculum for Excellence documentation;
- Impact: Pupils of all ages, abilities and dispositions to learning responded positively to learning opportunities that were situated in game based learning contexts. Teachers and parents observing positive changes in how learners perceived learning in school and themselves as learners;
- Research evidence The Dr Kawashima intervention led to two published academic research papers in British Journal of Educational Technology that showed low and mid-ability pupils improving maths scores significantly over a control. However self-efficacy and attitude was hardly affected (Millar and Robertson 2010, 2011, 2012).

LEARNING

Many of the ideas and methodologies that came from the Consolarium have been very successful and have been adopted in schools across Scotland, the UK and even further afield. The team received a number of awards and constant invitations to present the work around the world.

The biggest challenge that the Consolarium initiative faced in relation to getting its message out there was addressing the 'Folk Devil' image of computer games that had been established in mainstream media. However by addressing these fears with evidence and the presentation of an alternative positive perspective on game based learning, and suggestions for realistic accessible methods of use, these fears were overcome.

In terms of taking the concept of game based learning forward in the future then Robertson recommends is to stop using the term game-based learning. In essence good teachers use good tools to affect good teaching and learning and contemporary digital tools that sit firmly within learners cultural domains should be used and viewed as any other good resource that might help children to learn. Giving new ideas and approaches to learning specific names may allow those ideas and approaches to become known as they try to establish themselves but in the longer term it may be the case that the name becomes more of a hindrance than a help as the shine of a 'new' initiative begins to fade.

2.8.2 Digital Gaming for employability and engagement into work (UK)

Stephan Hands, Founder and Director of LearnPlay and 3dNative stephen@3dnative.com

Type of game practice	Game-Making, Engagement though alterative education
Date of action	2002-
Client/Market/Users	Public funders of employability training and community development
Target groups	Young people (NEETs), Communities inc older people
Objectives	For NEETs – reengage with learning, develop skills, improve employability
Distribution and adoption	Courses in LearnPlay centre, and local outreach.
Use context	Non-formal education centre, and community centres
Designer(s)/Editor(s)	LearnPlay and 3dNative
Location and Language	UK, English
Development Costs	Employability course – 100K GBP. Development costs not covered
Business model	Non-profit organisation, working to contract (needing to cover costs)
Details	Draws on the enthusiasm of young people for video games, and convert this into a constructive programme for developing employability
Website	http://www.learnplayfoundation.com/

AIMS and IMPLEMENTION

LearnPlay is an NGO dedicated to using game based approaches to promote social inclusion, and 3dNative is a multimedia and game development company working in entertainment and serious game markets. Both are based in the West Midlands, in an area of deprivation and high unemployment. From running a cybercafé and gaming centre in a deprived area Stephen Hands and his colleagues developed a games based approach to employability training, demonstrating effectiveness in service delivery on government contracts, and exploring the digital games in many settings from care homes to community development, and accumulating over 10 years of experience demonstrating how the passion that young people have for video games can be turned to positive use in their training for work. Since this time, LearnPlay have delivered a myriad of projects which have reached over 5000 young people.[98]

The main focus of the LearnPlay work has been on young people age 18-21 out of work and training. These young people often lack confidence and self esteem, and have low educational attainment in formal schooling. Using contracts from UK agencies supporting skills training, programmes were developed to deliver employability training over 1 year to young people, based on engaging them though game development, creating interest in learning, and learning a range of skills to enhance their employability. One such program the 19 Project, reached 175 young people, and cost 100k GBP. As Hands points out, the use of commercial gaming platforms motivates the young people, for whom videogame are a core interest of young people. The video games help create a safe and familiar environment where they can build confidence. They also have ambition to work in the gaming industry, but even if they do not eventually reach that goal, they still gain valuable skills in technology, design and team work, time management, leadership applicable in other professions. In another programme, ESF Works, LearnPlay Foundation received funding from the West Midlands Councils and Skills Funding Agency's ESF programme to reach young people in sessions with a facilitator and gaming consoles, to help them to identify their talents and skills. This project reached 600 young people (40 sessions with up to 15 participants in each session). As well as working with young people in, LearnPlay has also run programmes using digital games in community regeneration, with families, in schools and in care homes.

98 More details are available at the following links:
http://www.guardian.co.uk/world/2012/jan/25/europa-deprived-young-people-video-games
http://www.esf-works.com/projects/projects/400800
http://www.epractice.eu/en/cases/gamingthetibby

In addition to LearnPlay Foundation, Hands runs a games development company that currently offers 200 apprenticeships to young people to learn the skills necessary to work in the games industry. Hands sees the video game industry as a key industry for future growth and jobs, but without the necessary training of skilled young people, this growth cannot be realised.

LEARNING

Hands recommends a number of policy steps to take advantage of the potential of digital, games and gaming in engaging young people with ambition to work in and with digital games. In particular, **building bridges between the digital game industry and the education system**, including **curricula and support infrastructure** to enable the use of digital games-based approaches, including **game making and game playing** that not only engage students in education, build skills and competences associated with digital games, but also to build a generation of young people with skills in digital game design and development to supply this dynamic and growing industry.

2.8.3 Aarhus Social and Healthcare College, Denmark,

Senior EU Project Manager Jan Gejel

Type of game practice	Game-Making, specially made games to improve engagement through alterative education.
Date of action	From 2000 -
Client/Market/Users	For a vocational education college
Target groups	Young people from deprived background, many with immigrant background, generally out of education and training (NEETs)
Objectives	Reduce 30-40% dropout rates from conventional courses. Reengagement with education, and reinsertion into conventional vocation training
Distribution and adoption	Used within college, current project, LABlearning, aims to develop and share good practice across Europe
Use context	College education – alternative classroom
Designer(s)/Editor(s)	Aarhus college
Location and Language	Denmark, Danish
Development Costs	N/A
Business model	Improve success rates.
Details	Educational process and didactics redesigned around a game- approach.
Website	http://www.sosuaarhus-international.com/LABlearning.htm

AIMS and IMPLEMENTATION

Aarhus College trains young people for work in health and social care, but like vocational training colleges across Europe suffers 30-40% drop out. Experiments with media and game development convinced them that a new approach to learning would stop them failing these young people. An EC award has allowed the college to radically rethink how to engage disaffected young people in learning. Jan Gejel has been part of a team leading these developments in the last 10 years. Year long introductory classes to reengage young people into learning has now been turned into experimental media laboratories, a ground-breaking initiative launched in 2011. One of the bases for this is the College's innovative in house media team of professional media designers, created in 2003 to support the integration of ICT and media in the learning activities. This media team works directly with teachers and students in both everyday activities and long-term projects. (www.sosuMedia.dk).

The Aarhus approach is a specifically "educational" approach to serious games. Serious games are not well-defined entities or products, but should rather be conceived as complicated processes, communities or a line of activities embedded in learning. Serious games only make sense if deployed in creative learning settings, with project and problem based didactics and open laboratories of learning communities. The development of games involves a long line of activities from idea though design to final product that involves open dialogues and challenging collaboration. Working with games is fun, but it is 'hard fun'' that inspires young people who have lost any interest in learning and self development.

Following a national Danish grant in 2011, two further grants, the Comenius 2 years LABlearning project, providing provided the innovative laboratory didactics and the InterReg 3 years Scandinavian Game Developers providing the serious and social gaming input. The LABlearning project provides the basic learning approach: youth teams working in media projects linked to real-life, to the community and to the talents and aspirations of the young people themselves. The teachers are now mentors for the youth teams, and the College is populated by other professionals than teachers, such as media designers, game designers and community collaborators. The media laboratories will be implemented in several European countries, but the Aarhus College is the Flagship laboratory. The InterReg project Scandinavian Game Developers provides new business models for young game developers, working in game incubators, now involved in long-term collaboration with teachers, mentors and students at the College, instead of producing entertainment games for the market. A key partner is the Intel Computer Club network, based in Boston. However, to reach this point has been a struggle, primarily to obtain funding.

LEARNING

The primary recommendations that Jan makes are the need to recognise that digital games in education are not about consumption of products, but about practices of design and social dialogue, and thus require the building of communities of immersive learning, of learners but also other sorts of mentors, including teachers and game designers. This requires new didactics, which in turn requires new educational and funding programmes that are ready to offer the needed flexibility to support such extremely creative and powerful learning processes. Digital gaming is constantly changing, and requires forward thinking investment and research by doing. Existing educational systems that use test results are not conducive to experimental methods; and teacher cultures can take many years to change.

2.8.4 Summary

These cases are a rich source of knowledge on types of intervention, outcomes, and the processes and stakeholders involved in bringing a game-based approach to fruition. For outcomes, many of these studies had formal impact assessment, but this is often not the case. Even where it is the case, outcomes are hard to measure. Output measures are useful, especially when measuring improvements in dropout rates, but are not so convincing.

The process descriptions show the involvement of a wide range of inclusion intermediaries and sponsors, and the need to include researchers to provide input to development, and evaluation of outcomes. The sustainability of projects is clearly an issue. In two cases the developers failed financially. The Consolarium failed to maintain funding. The Aarhus and LearnPlay cases illustrate the struggle to obtain funding for initiatives based on digital games, either because of the negative images of games among decision makers, or the lack of flexibility of funding programmes.

To even find these examples was difficult, and many of those involved were not aware of the work of others. The developers involved (e.g. PlayGen, Learn Play, Aarhus) spoke of accumulated good practice knowledge that had not been codified and not been shared, and is therefore not yet available more widely.

These issues are explored in more depth in this Chapter, in Chapter 3 and in discussion of Challenges in Chapter 4. Learning from these cases, and the practice that they illustrate are the basis for recommendations for actions in Chapter 4.

2.9 How do digital games enable learning and participation?

In this section we move away from specific cases towards a more abstract, generalisable approach that explains the way that digital game-based approaches deliver the positive outcomes that have been identified in the examples. Bringing together different theoretical and empirical strands of evidence, a seven dimensional framework is proposed to help understand how digital games can support empowerment through learning and participation (Table 18). As the vast majority of research in the field of digital games comes from education and learning, drawing on experimentation and observation done in the framework of psychological, sociological and pedagogical theory, the framework is primarily expressed using the language and concepts developed in these disciplines.

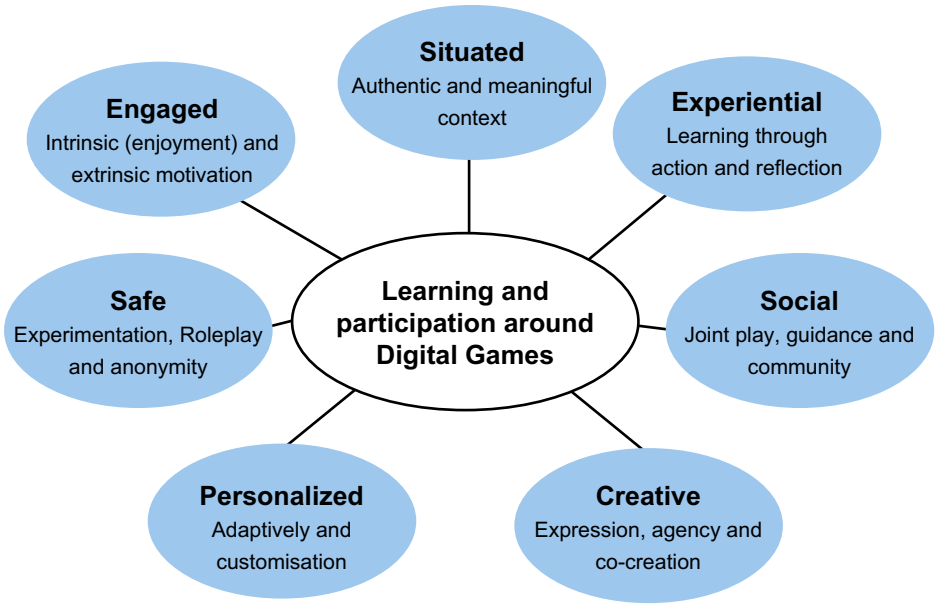
Engagement

In the context of empowerment and inclusion, stakeholders that wish to (re-)engage people in a particular activity can make use of game play in several ways. The most straightforward relates to the **intrinsically motivating** power that game play can hold, bringing a sense of confidence, belonging and autonomy. Games are a prototypical example an activity that is carried out for the sake of doing it and not to attain some external reward, often interpreted with concept of Flow (Csikzentmihalyi, 1990) (Hoffman & Novak, 2009; Chiang et al., 2011). Overall, intrinsic motivations for playing games can be triggered by different in-game elements. These can be classed in three categories: Person and character related elements; Game related elements; Elements related to graphical representation. These include sense of control, feedback, challenge, autonomy, realism or fantasy, drama and reward etc. Certain aspects of game play may make this activity interesting for many people, but not necessarily for everyone. It requires that a person's basic needs for competence (i.e. **self-efficacy**), relatedness and autonomy are satisfied. A person's social context plays an important role in this respect.

For many people of all ages, playing well-designed games and/or making games is considered an enjoyable activity, giving them a sense of confidence, belonging and autonomy. This interest can also drive them to other activities in support of game play/making, such as reading game-related resources (Steinkuehler, 2011).

Digital games play can also drive people to other activities related to game play/making that are part of the **gaming ecology**, such as reading game-related resources (Steinkuehler, 2011) or developing game mods. Yet others try to capture the design elements that make digital games enjoyable and integrate them into non-play activities, often referred to as **gamification** (Deterding et al., 2011).

Figure 4: A generalisable framework for DGEI outcomes



Extrinsic motivation refers to engaging in an activity as a means to an end (Vallerand, Fortier, & Guay, 1997, in Garris, Ahlers, & Driskell, 2002). Extrinsic motivation is, again a multi-dimensional process resembling intrinsic motivation and is encouraged by a social context that encourages in a caring, yet not over-controlling way (Deci and Ryan, 2000).

Whatever type of motivation exploited in an initiative that makes use of games, this motivation will not come from the digital game in isolation. Intermediaries, family members, neighbours can not only introduce people to game-based initiatives but also motivate them to continue to participate and to make the link between in-game and out-of-game experiences. Through exchanges with other participants, participants can learn from others' experiences and become part of a **community of interest**.

Experiential learning

Advocates of digital games as learning tools have pointed to the links between game play and learning experiences. This claim is associated with the constructivist or **experiential perspective on learning**. According to this view, experience plays a key role in the learning process; learning is seen as "the process whereby knowledge is created through the transformation of experience" (Kolb, 1984, p. 38).

Several game researchers and theorists have used experiential learning theory to understand game-based learning. As people play they encounter obstacles, need to solve problems and gain understanding of the, at times highly complex, game system to make progress. Authors such as Garris, Ahlers and Driskell (2002) and Ulrich (1997) refer to the **game cycle** of continuously adjusting action to feedback given during game play and to the combination of **game play and reflection** as ways in which the learning process takes place.

Garris, Ahlers and Driskell (2002) describe the game cycle as follows. Through game play, a person is confronted with particular game features that trigger particular judgments or reactions such as interest, enjoyment, involvement, or confidence. These reactions in turn lead to behaviours such as greater persistence or intensity of effort. These behaviours result in system feedback on performance in the game context. This system feedback leads to new user judgments and the continuation of this game cycle feedback loop.

In essence, being interactive systems, digital games are highly apt to experiential learning. During game play, players learn by doing through interaction with the game system but also, as Ullrich (1997) and Garris and colleagues (2002) point out, through feedback from others. This brings us to the next element of learning and participation.

Social learning and participation

Game-based learning can be further improved through communication with those guiding the process (mentors, guides, counsellors, ...) and fellow learners (Garris, Ahlers, & Driskell, 2002). Social interaction with fellow players in the game or conversations afterwards that highlight key concepts and link in-game to out-of-game events can provide a scaffolding to lift the learning activity to a higher level. Crookall (1995) and Petranek (2000), for example, have described positive effects of such **scaffolding** in the context of simulation.

Digital games have the potential to **improve social skills** and **foster communities** of practice in which knowledge is shared informally and members feel accepted and respected.

For those at risk of social exclusion, this is highly relevant. Being able to interact meaningfully with family or friends and to identify with a cultural group or community and to feel recognized by others is a key part of societal participation. Those who can fall back on a strong social network will also feel supported in engaging in activities they might not feel confident to undertake alone.

In essence, all digital games can become the subject of a community of people with shared interests. In some cases, however, this process is reinforced by offering **in-game social interaction** and through **active community support** around the game (e.g. social network games, modding groups, discussion forums). Whether one is willing to identify with such a community is likely to depend on the extent to which one can identify with how players are represented in the game.

Situated and authentic learning

Both game play itself as well as the virtual, physical and social context in which it is set can act as a way to situate learning. The notion of situated cognition was first described in educational psychology by Brown, Collins and Duguid (1989). It is a specific expression of the situative perspective on learning that we referred to earlier in the report. It refers to the idea that, only by conveying knowledge **in context** and illustrating it in the authentic situation of use, complete understanding can be achieved in a way that people learn how to use this knowledge (Brown, Collins, & Duguid, 1998).

Digital games have the potential to offer a narrative and immersive environment and social community in which players have an experience that feels **authentic**. People that participate in a game or game-based initiative do not enter it as a tabula rasa, but with their own set of prior experiences, beliefs (e.g. self-efficacy), motivations to participate, and emotional state; all related to the socio-cultural context in which they are situated. Game play provides an opportunity to engage in interest-driven learning (see Jenkins, 2006b; Ito and Bittanti, 2010, both discussed earlier), where they can relate what is being learnt to what interests them.

From this perspective, it becomes clear that, if we wish to approach those at risk of exclusion through digital game use, we should situate it in the scope of a broader project that accounts for their social situation, current gaming practices, and other interests and activities they are already pursuing.

Creative engagement

Digital games can also be a site for creative learning and participation. As we have described, the **constructionist perspective** on learning attributes particular importance to the role of 'making' in this process (Ackermann, 2001). When creating an artefact, people need to find a way to make most of the tools they have access to at that point to make their ideas materialize.

Creative expression surrounding digital games can take place in more or less formalized ways. Making and sharing games and game modifications have become part of youth culture. Researchers and practitioners experiment with co-creation workshops in which they encourage people to actively participate in creating games. In some cases, such participatory design methods are deployed to create games for their own community.

Through game making, participants can acquire digital skills, break out of their social isolation and positively contribute to their community. Several authors have argued that a participatory approach is a promising route to empowerment. It presents a way to avoid that existing power relationships are reinforced (Lim, 2008; Prensky, 2008) by giving people a sense of agency (Sime, 2008), thereby increasing the chances at success of an e-inclusion initiative (Teles, & Joia, 2011).

Personalized support

Digital games afford a highly personalized experience: a single play session is always unique as it emerges from the interaction between game and player(s). **Personalization** has been put forward as one of the key principles to optimize learning by Moore and Anderson (1969). For this to occur, the environment in which learning takes place needs to be responsive to the learners' actions and help him or her reflect on one's self as a social being.

Digital games allow for such personalization to take place in various ways. As players navigate the game space, they constantly receive feedback on their actions and they can compare their performance to that of others. In addition, **they can customize their experience** by personalizing their character or selecting their preferred difficulty level or play style. Finally, the game environment can adapt its shape and the learning tasks it presents to the user according to certain criteria such as previous knowledge or skill making the experience both more enjoyable and more effective.

In the context of empowerment and inclusion initiatives, the possibility to reach out to those at risk in a highly individualized way presents a welcome opportunity. Continued participation in education and training, for instance, is shaped by the degree to which people can be guided and mentored in a personalized manner. It has been explicitly stated that the highly different needs within at-risk groups require **a tailored solution** instead of a one solution fits all approach (Communities and Local Government, 2008b).

Safe participation and learning

Digital games can provide a safe environment, in which people can **experiment** without suffering the consequences and where they can discuss topics that may be difficult to bring up in everyday life. Many digital games enable **perspective-taking** through role-play and a range of digital games allow their players to act and communicate anonymously. The

ability to approach an issue from different viewpoints has been put forward as an important learning principle (Moore & Anderson, 1996). The ability to engage with each other **without having to disclose one's identity** has been suggested to make players feel more equal to each other and thereby less restrained than in everyday life (McComas, Pivic & Laflamme, 1998).

This aspect of learning and participation using digital games is relevant for social inclusion initiatives as people at risk have often become disengaged because of negative experiences they had in the past. In the context of a positive and playful environment where they feel they can discuss their feelings and experiences more openly they may gain some of the confidence they lack in other contexts.

This framework is summarised in Table 18.

2.9.2 Identifying outcomes of DGEI use

By bring these together with the outcomes identified in the empirical cases it is possible to build a more generalisable list of the potential outcomes of using game-based approaches:

- **Personal empowerment** – attitudinal and motivation change to support behavioural change, aimed at re-establishing personal agency and control, including building self-confidence, self- esteem, attitude, engagement with learning, life skills, awareness, identity building, wellness and coping skills.
- **Participation** – bring people together through play and game making, helping building social networks though contribution to communities of interest and personal communities, through to learning citizenship values and contributing to game-mediated community projects.
- **Core and transferable skills development:** using a variety of techniques to support learning and development of skills in literacy, maths; teamwork, creative thinking etc, and new '21st century' skills.
- Development of **specific skills** though game making including computing and other technology design, music and graphic arts and **specific knowledge** development and awareness facilitated by a digital game format.
- **Increased awareness** of issues of social exclusion among the general and specific populations about particular, tackling issues such as discrimination.

The cases and literature also show that game-based approach are not based on the design of a game that is used in isolation by an individual, but they are usually developed and deployed to support professional intermediaries in their work, often deployed in group work, and aimed at stimulating social interaction and the strengthening of participation and the social scaffolding necessary of successful empowerment.

While any one game-based approach, with a particular target group may not do all these things, well designed practices have the potential to build empowerment in these multiple dimensions.

In the following section the theoretical and empirical insights from the literature summarised here, are explored with more details through the lens of three main ways of making use of digital games: using commercial off-the-shelf games, designing and using specially made games, and though game-making techniques.

Table 18: Summary of framework for understanding digital games supporting learning for empowerment		
Mode of Learning	**Processes stimulated by game use**	**Contribution to social inclusion and empowerment**
Engagement	Engage people in learning through game play building on : 1/ intrinsic motivation or enjoyment of game playing 2/ driving people from games to other activities in the game ecology, such as reading 3/ using motivating game elements in other activities – gamification 4/ as en element of an extrinsically motivated, instrumental activity 5/ as part of a community that supports game use and link to out-of game experiences	Engagement in positive activities related to learning, knowledge and skill development Reengages people in learning Builds and reinforces participation and social relationships Creates mechanism to maintain motivation for behaviour change
Experiential Learning	1/ exploits **learning by doing** or experiential learning (constructivist) afforded by the game cycle of problem solving, through intense activity and learning through the game and interaction with others.	Supports development of skills in problem solving, learning and reflection Triggers positive reactions such as interest, enjoyment, involvement. Builds confidence and sense of self-efficacy Help individuals modify behaviours
Social Learning and participation	Social interaction occurs naturally in and around digital game play. 1/ Game-based learning though interaction with mentors and peers (fellow players) which provides a scaffolding effect. 2/ Help build an informal, supportive community based around game playing (including in game) that provide context of social participation and identity strengthening	Provide 'social scaffolding' for learning Build social skills Foster communities of participation and support Support identity within a community ad around an activity

Mode of Learning	Processes stimulated by game use	Contribution to social inclusion and empowerment
Situated and Authentic Learning	1/ Virtual, physical and social context facilitates situated learning. *2/ Authentic* learning as digital games use accords with a player's own set of prior experiences, beliefs (e.g. self-efficacy), motivations to participate, and emotional state; they can relate to what is being learnt and the form that game takes, and the environment of learning 2/ Provides an opportunity for interest-driven learning for people with deep familiarity and interesting digital gaming.	Supports learning in a familiar and authentic context, Motivates and build skills
Mode of Learning	Processes stimulated by game use	Contribution to social inclusion and empowerment
Creative Engagement	People are interested in creating and changing games: by involving people in game design, learning becomes instrumental to a larger intellectual and social goal. 1/ Pursue constructivist learning though making games 2/Develop skills and knowledge, confidence and support agency through game making	Facilitates skill development Develops creative thinking and problem solving Supports self-efficacy Confidence and support for personal agency
Personalised learning and support	1/ Unique interaction between game and player provides for personalisation of learning – game and play adapt game to leave and style appropriate to individual	Learning though personalised and tailored solutions Tools to support intermediaries in providing personal support
Safe participation and learning	1/ A safe environment in which people can **experiment** without suffering the consequences 2/ Perspective-taking through role-play 3/Supports anonymous participation 4/A Positive and playful environment helps build confidence	Overcome negative experiences Gain confidence Learn though role playing and seeing other perspectives

2.10 Learning and participation through games: three approaches

Whilst the large majority of digital games are design for and consumed as entertainment, a growing number is being created and/or played for other purposes. These goals include transferring knowledge, teaching skills and raising awareness concerning certain topics (Zyda, 2005). Sometimes so-called commercial off-the-shelf games (COTS) for entertainment are used in this context but more often special-purpose games are created, which are often referred to as 'serious games' (Zyda, 2005: Michael & Chen, 2006). In this report the terms special-purpose and COTS digital games are used, which allow us to distinguish between games that merely aim at entertainment and those that do not without downplaying the importance of the former as either unserious or meaningless.

In what follows, we explore three different means in which digital games are being used for learning as potential pathways to empowerment and inclusion, both drawing on theory and giving examples of games that have been designed using the approach. As outlined in the previous section **Learning** is hereby not just associated with education or training, but **understood in its broadest possible sense including participatory aspects**.

These approaches are

1. **Special-purpose digital games (DGs):** Digital games developed specifically for learning and participation

2. **Commercial Off the Shelf DGs:** Learning and participation through COTS digital games that were not specifically developed for this purpose

3. **Digital game making or co-creation:** Learning and participation by making digital games

Other types of games are included in this categorisation for the purposes of this report. 'Gamification' for example, or pervasive games can be included when there is a digital component, and may be developed and used in any of these three categories.

Figure 5: Three modes of game use for learning and participaiton

2.10.1 Special-purpose digital games developed for learning and participation

Digital games developed for learning are geared towards specific outcomes. Indeed, learning is often clarified by the outcomes that are generated in the process (Gagne, 1984; Kraiger, Ford & Salas, 1993) which tend to be subdivided in three categories, identified earlier as significant in processes of empowerment and social inclusion:

1. **Knowledge transfer**

2. **Skill acquisition**

3. **Attitudinal and behavioural change**

In addition there are games are developed not to target particular learning outcomes, but purely as common objects to bring people together, stimulating social participation and strengthening social ties, through digital play.

Before we discuss these processes and outcomes and examples of games that have targeted them – adding also games specifically aiming at increased participation - we begin with a more general discussion of games as designed learning environments and experiences.

Digital Games as designed learning environments and experiences

Moore & Anderson (1969) state that different kinds of complexity in information are important to structure the environment in which a message is conveyed or skills are developed which in this case is a game space. According to Moore & Anderson, four principles are important to maximize the 'learning' experience (in this context meaning information/knowledge transfer, skill development and attitudinal and behavioural change). Two principles of these principles, **Perspectives** and **Personalisation**, highlighted in the framework above, can be applied in a digital game, although not necessarily for all game genres.

The **Perspectives principle** posits that the best way is to learn about a subject to approach it from different points of view or perspectives of the actors involved in this certain situation. Games such as role-playing games incorporate the perspectives principle, allowing players to place themselves in a certain role and approach certain subjects or events from different perspectives.

A second relevant principle is the **Personalisation principle,** which refers to a twofold concept, consisting of a responsive and a reflexive element. A learning environment must be responsive regarding the actions of the learner, giving them a chance to explore things freely, informing them about the consequences of their actions chosen and it evolves at the pace of the player in order to create a reflexive image of themselves so that they can see themselves as a social subject, from the point of view of others. This is a common practice in sport activities. The personalisation principle can be used in digital game design, because games have the capacity to include a feedback mechanism and let players 'explore' the game world freely. The game space or world also creates the opportunity to let a player reflect about their position vis-à-vis their goals (Clark, 2007). This is a result of the feedback mechanism that can be included in a game space, but also the result of rankings, scores, trial and error and being able to see consequences of certain actions or behaviours (Malone, 1981).

Mayes and De Freitas (2004) point out that that the **overall learning perspective that developers of learning tools adhere to has important consequences.** Each perspective can be mapped on beliefs about what constitute valuable intended outcomes, particular design choices and how learning and empowerment should be assessed (Table 19). Although they were referring to the design of e-learning environments, we believe their mapping is also useful when considering game-based approaches.

Knowledge transfer

The goals of games for knowledge transfer coincide with cognitive outcomes of learning and can mostly be found in education and training. Cognition is generally seen as the knowledge and ideas or opinions a person holds, and the mental activity involved in processes such as studying, thinking, interpreting and problem solving. (Gagne, 1984; Kraiger, Ford & Salas, 1993. Educational games integrate knowledge that is related to a curriculum or teaching plan and can thus be embedded in a classroom or course context. **Immune Attack** (Escape Hatch Entertainment) is an example of a game for knowledge transfer used in education. The aim of this game is to teach pupils how the immune system works (Kelly et al., 2007). Other examples are **Supercharged** (MIT), introducing first year college students in understanding introductory electromagnetic reactions (Mayo, 2007) and Frequency **1550** (Waag Society), a mobile game teaching Dutch children about the history of Amsterdam (Akkerman, Huizenga & Admiraal, 2009). Social game **Kompany!** (Ouat Entertainment) aims at teaching players vocabulary concerning the business environment, which could be a useful tool for people with another mother tongue to integrate in the business world. Other games for knowledge transfer concerning training are **Get Marketing!** (PIXELearning) to raise awareness about marketing concepts and how it can be applied to the marketing cycle to generate additional sales or **Tactical Iraqi, Pashto, Dari, French and Indonesian** (Alelo) used by the American army to teach their officers local languages when on a mission.

Skill acquisition

Games for skill acquisition primarily aim at skill-based outcomes, whereby skill is primarily associated with **technical and motor skills** (Gagne, 1984). Digital games all involve introducing players to new skills, then allowing them to develop, practice, refine and finally perfect them (for

Table 19: Mapping learning perspectives on intended outcomes, design of learning tool and form of assessment based on review by Mayes and De Freitas (2004).

Perspective	Intended outcome	Pedagogical design	Assessment
Associationist	Focus on mastery of mental and behavioural units of increasing complexity	Supporting routines, clear goals and feedback	Assessing knowledge, skill components
Cognitive/Constructivist	Focus on active ownership of learning, task outcomes are discussed with guide/ peers	Support for experimentation, guided discovery, interaction, dialogue and reflection (focus on guide)	Assessing broad conceptual understanding
Socially mediated constructivist	Focus on discussion across group of learners	Support for experimentation, guided discovery, interaction, dialogue and reflection (focus on peers)	Assessing broad conceptual understanding
Situative: Community of practice	Focus on real-world practices of formulating and solving realistic problems	Support for identity development, learning in informal context	Peer assessment, assessing participation, authenticity of practice

example Kraiger, Ford & Salas, 1993). This feature of games can be applied to supporting a range of types of skill, not only motor skills. Games for skill acquisition cover subjects such as managerial skills, such as **Virtual U** (MIT) and Diversité (Daesign). In Virtual U, college students are placed in the role of university president to learn management and administrative practices (Charsky, 2010). In **Diversité,** managers practice in taking decisions exclusively based on competences (IDATE, 2012).

Games can also be used sector specific. The games **Patient Rescue** (TruSim) and **Interactive Trauma Training** (Birmingham Serious Games Team) for example, are games developed for medicine students. For example, in Patient Rescue players learn to recognize signs of patient deterioration, use set protocols to assess a patient's condition and intervene effectively. (Susi, Johannesson & Backlund, 2007). Transmedia Inc. for example developed the **Objection!** Series, which cover courtroom skills in legal education. **The Monkey Wrench Conspiracy** (games2train) aims at engineers and teaches the players how to use new 3-D design software. ForgeFX develops games for safety training.

A **Cardinal Direction** and **Skewer are** example of mobile-based special-purpose digital games for visually challenged children developed in Seoul, to promote spatial skills and executive functioning. These are auditive games running on low cost mobile devices called TeacherMates™., which were evaluated by blind Malaysian children and found to be easy and enjoyable to use and appeared to stimulate collaboration (Song, Karimi and Kim, 2011).

Attitudinal and behavioural change

Games for attitudinal and behavioural change, which include games for raising awareness in certain topics, primarily aim at affective outcomes. These are aimed at individuals at risk of exclusion, and for general society, to raise awareness and change behaviour in relation social exclusion (e.g. discrimination). Affective outcomes can be both attitudinal and motivational: internal conditions that influence behaviour (Kraiger, Ford & Salas, 1993). Affective outcomes can be an important element in games due to the fact that motivations and attitudes can stimulate a certain behaviour or a certain mode of thought.

Attitudes can thus be influenced in different ways: one can teach a person 'new' attitudes or change existing ones (Gagne, 1984). Attitudinal changes can be an important aspect of certain types of training, in safety regulations for example. Changes in the behaviour of employees with regard to safety procedures can be produced by changing the level of importance that is accorded to safe behaviour in a positive way (Kraiger, Ford & Salas, 1993).

An important element of **motivational change** is self-efficacy, which refers to the perceived performance in a certain activity. The more a person believes they are able to bring a certain task to a successful ending the better he or she will perform at this task (Kraiger, Ford & Salas, 1993). When self-efficacy and thus the belief to succeed is high, people will be more likely to take on that task (Luszczynska, & Schwarzer, 2005). Self-efficacy can be positively stimulated by dividing tasks of higher difficulty into smaller, less difficult tasks (Kraiger, Ford & Salas, 1993).

Digital games can also specifically aim to raise awareness concerning certain issues and thus attain certain attitudinal and behavioural changes. Common themes are health, general well-being and societal challenges such as ecology. There are different games for health that cover the subject 'healthy eating' (i.e. **Squire's Quest** by Children Nutrition Research Centre[99]), games for diabetics (Escape from Diab by Archimage; Packy & Marlon by WaveQuest), and games for asthma (**Wee Willie Wheezie** by Astra Pharma Canada Inc.; **The Asthma Files** by Nottingham University Hospitals and the University of Nottingham) and cancer patients (**Re-Mission** by HopeLab). Games that cover the theme general well-being are games about subjects such as ecology (**Enercities** by Paladin Studio's, Fate of the World by Red Redemption) and world poverty (**Food Force** by World Food Programme).

Participation

While participation, meaning social interaction and shared practices, is a fundamental aspect of learning, some digital games have been developed specifically to promote participation in society without targeting specific learning outcomes.

Age invaders is an intergenerational mixed reality digital game for families that was conceptualized and developed in the Singapore-based Mixed Reality Lab.[100] It was created in response to the observation that although older people are participating more in digital games, they rarely play with their family members, while this could benefit family bonding, help bridge the gap between elderly and youth and improve the health and well-being of elderly (Khoo, Merritt, & Cheok, 2008). A digital game prototype was created that allowed both co-located interaction and remote, physical and virtual interaction. Children and grandparents engage in a playful competition: a co-located laser game that is coordinated remotely by one of the parents. Overall, these results show that both generations enjoyed playing the game, particularly the physical interaction part of it.

A strong illustration of learning and participation going hand in hand to promote empowerment is the **Stanford Pocketschool project.** This project focuses on mobile empowerment of underserved, poor communities around the world.[101] Underlying the project is the conviction that empowerment emerges from an interaction process (Kim et al., 2009), Skills and knowledge are not simply delivered to the community, but people are enabled and encouraged to become more active and give back to their community in a sustainable manner. Mobile technology is considered a suitable option to achieve this goal, given that it is becoming ever more widely adopted in developing countries. For example, the storytelling and educational gaming applications created by a non-profit institution called Innovations for Learning to empower children and adults living in poor rural communities in Asia, Africa and Latin America (Kim et al., 2008; Kim et al., 2009, Kim et al., 2011). A mobile farming simulation game was created to promote understanding of micro-credits and stimulate such entrepreneurship in farming. The authors believe that the key to success of these programs in underserved communities lies in the combination of education, infrastructural support with the aim of empowerment in every day life.

2.10.2 Learning and participation through commercial digital games (COTS games)

An alternative to developing games specifically for the purpose of learning and participation is making use of the positive qualities that are already incorporated by digital games readily available on the market. From the earliest days of digital games, end users themselves used the virtual text-based online games or Multi-User Domains (MUDs), for self empowerment (Turkle, 1995), and professionals and researchers especially in education have observed and studied the positive benefits of using entertainment (COTS) games, for learning, socialising and self-empowerment.[102]

In this section, we take a look at the characteristics of COTS games that specifically make them good *learning* tools, which result in **informal learning** and consider examples of using COTS games both in **formal and non-formal** learning contexts. By formal settings we mean learning settings like classroom and training centres where the primary activity is structured learning. By non-formal learning, we mean contexts, such as community centres, where activities are not structured around learning, but where learning is nonetheless an encouraged and informally recognised outcome of other activities.

Informal learning in COTS digital games

Before considering the formal and non-formal settings mentioned above, we can consider the sort of learning that occurs by playing digital games for entertainment purposes (recalling the results of the PISA study mentioned in the introduction (Biagi & Loi, 2012)). In a reflection on his earlier work Paul Gee, a leading research on digital games for Learning (Gee, 2003, 2004), Gee (n.d.) argues that good games are those games that incorporate good learning principles. Regardless of whether one agrees with this normative statement, his work presents an interesting, concise yet comprehensive list of learning principles as they can be exhibited by digital games in particular (see Table 20). As well as other benefits of game playing mentioned earlier, more recent work has focused on the potential of leisure game play for literacy development, with both in game reading, and reading in activities around gaming (Clarke &

99 For an evaluation see Baranowski et al (2003).

100 see http://mixedrealitylab.org/projects/all-projects/age-invaders/

101 http://suseit.stanford.edu/research/project/pocketschool

102 This is not to say that the negative aspects should not also be recognised and explored.

Treagust, 2010). On the basis of experimental evidence, Steinkuehler (2011) suggests that playing video games is a "powerful solution to—rather than a cause of—the problem of adolescent boys and reading".

Using COTS digital games in formal and non-formal learning contexts

Commercial-off-the-shelf (COTS) digital games that were developed primarily for entertainment purposes can also be used in formal and non-formal learning contexts, that is outside the leisure spaces and places usually associated with gaming.[103] Commercial games are thus not restricted to pure entertainment, but can also be used to present intellectual challenges or content (Charsky & Mims, 2008). A key advantage COTS games offer is that they typically contain more seductive graphics, such as 3D, and sounds that can be created with higher budgets, and, particularly for young people, are familiar forms and titles to games used in leisure time.

COTS games have been used in a **formal learning contexts,** such as the classroom context (Wastiau, Kearney, & Van den Berghe, 2009) where they have been shown to be effective in teaching content, skills and problem-solving, when they are needed to make progress in the game (Van Eck, 2006), and as the basis for a constructivist or generative teaching and learning method, the approach used in the Scottish Consolarium case presented earlier.

Table 20: Learning principles as they can be present in digital games. Based on Gee (n.d.)

Learning principle	Description
Identity	Taking on an identity in the game and thus making an extended commitment of self
Interaction	Interactive relationship between player and game space/world so that actions are situated
Production	Players co-author their experiences, but can also participate in game creation through modification
Risk taking	Low consequences of failure encourages risk taking and exploration
Customization	Customization according to personal learning and play styles
Agency	All previously mentioned principles afford a sense of control and agency
Well-Order problems	Finding solutions to earlier problems helps solving later more complex problems
Challenge and Consolidation	New mastery of problems becomes consolidated through varied repetition
"Just in Time" and "On Demand"	Giving information just when the player needs it, or when he or she requests it.
Situated meanings	Situating the meaning of words in different contexts of use
Pleasantly frustrating	Given many of the previous principles, games manage to keep challenge to a doable level
System thinking	Games encourage players to think about relationships, processes, cause and consequence
Explore, think laterally, rethink goals	Encouraging to think about different alternatives to reach a goal, follow side-tracks
Smart tools and distributed knowledge	Knowledge is distributed across a player, non-player characters and/or other players
Cross-functional tools	Knowing and making use of different resources within the team
Performance before competence	You don't have to know everything about a particular domain before you can participate in it, participation begins immediately

103 Although the idea of places for gaming – such as the home or game cafes – defined by where game devices are located is challenges by game playing on ubiquitous PCs, and by mobile handheld devices which make any place a game-playing place.

Since COTS games have not been designed for a particular learning method or context, it is essential that such games should be part integrated in education or training as part of a contextualising 'toolkit' to achieve the desired outcome. It should be introduced, concepts should be clarified and a debriefing afterwards is recommended. For example, a link can be made between game scenarios and real world physical environments. In **The Land of Me,** school children explored a riverside in the game space and similarly explored an actual shoreline. The screen-based experience actually encouraged the children to exercise, doing non-screen based activities. The Land of Me fostered their creativity and stimulated the children in using their imagination and thinking skills (MadeInMe, 2012).

Van Eck (2006) provides an overview of the issues that need to be considered when using COTS in the classroom, an approach that can be applied in any learning situation Teachers or mentors need to find a game that can be matched to the outcomes they attempt to reach. They want to convey and establish how they will align the game with their teaching activities. Games can function as an advance organizer prior to teaching activities, be a part of the teaching activity in itself or serve to synthesize or assess what was taught afterwards. In addition, teachers need to address what is covered by the game (perhaps in an inaccurate way) and what is not and how they will deal with this and make students aware of it. In addition they will face with various technical, financial, infrastructural and training challenges in assembling the material. All of these constitute challenges that policy can address, as highlighted by the EU policy-support project IMAGINE (Blamire, 2010) and the UK JISC study, Learning in Immersive Worlds (de Freitas, 2006).

Other examples of COTS games include **Civilization** (MicroProse) for teaching history (Van Eck, 2006; Wastiau, Kearney, & Van den Berghe, 2009) and promoting civic engagement (Squire & Barab, 2004; Kahne, Middaugh & Evans, 2008), **The Sims 2** (EA) used in a school in Denmark to teach the Danish language to 6th graders (Wastiau, Kearney, & Van den Berghe, 2009), and **SimCity** (EA) used to teach civil engineering and urban planning (Van Eck, 2006). The strategy game **Patrician III** (Ascaron entertainment) has been used in a multi-domain context, combining aspects of history, language and information technology (Wastiau, Kearney, & Van den Berghe, 2009).

Farm Frenzy (Big Fish games) has been used in a school in France to teach children methodological skills and to improve players' critical awareness, logical thinking, social skills and confidence in a school context (Wastiau, Kearney, & Van den Berghe, 2009). **Zoo Tycoon** (Microsoft Games Studio) was deployed to teach language by relating the game to other activities such as writing assignments or using the game to teach foreign language vocabulary. The game has also been used to train economic competences, planning and team work and to teach children about animals and their habitats in biology (Wastiau, Kearney, & Van den Berghe, 2009).

The use of COTS games in **non-formal learning contexts** has so far received less attention than their use in formal learning contexts. In the UK, the Game2Grow project[104] was started up in 2007 to teach intermediaries in community centres to use digital games and gaming technology to re-engage disadvantaged learners. The 2008 Byron Review (Byron, 2008) reports positive feedback from the projects' participants who felt empowered by it. More details on the project are unfortunately hard to come by.

Based on the available literature, it can be concluded that commercial games can not only be used to teach subjects associated with school curricula (biology, history, language learning, etc.), but can also be helpful in training certain skills important for social inclusion, such as social skills, planning, economic competences, etc. and in influencing attitudes such as civic engagement, confidence in a classroom context and motivation towards language learning. On the use and benefits of COTS games in non-formal learning contexts far less documentation can be found.

2.10.3 Empowerment by making digital games

A third way in which games can be related to empowerment is the pathway of learning and participation by creating games. In what follows, we consider this relationship, how this has been approached and the availability of tools that facilitate it.

Game making approaches

In constructionist theory, learners are defined as 'builders' of their knowledge. When learners have been given the assignment to design something for the use of others, learning becomes instrumental to a larger intellectual and social goal. In this way, participants learn by asking questions and actively looking for information. Learning through designing artefacts addresses problem solving skills and planning abilities and emphasizes the importance of learning as a process (Kafai, 1996).

Two approaches are recognised in constructionist theory: the top-down approach (Papert & Harel, 1991) where context, content and structure of design are mapped out from the beginning and a bottom-up approach where, which implies that design emerges in the process of implementing it (Turkle & Papert, 1991).

When looking beyond content, however, one could say that making games does empower people by providing 'a rich context for learning programming, how to collaborate with others, becoming a member of an affinity group, developing sustained engagement, and more' (Peppler & Kafai, 2007, p.6). This was observed among high-poverty African American and Hispanic adolescents between the age of 10 and 14 who took part in game production activities at

104 By the LearnPlay Foundation, one of the Experts case of this report.

a branch of the **Intel Computer Clubhouse**[105] (in South Central Los Angeles). In this example, an Hispanic adolescent who was considered as unsocial by his peers and mentors during, evolved in being widely accepted by his peers and was also considered as a 'mentor' for his peers, due to his impressive work. The activities in the Computer Clubhouse also helped the adolescent in creating future aspirations: attending M.I.T. in order to becoming a professional game designer. The adolescent stated that: '... it teaches how to play games and make games and it helps us figure out our future' (Peppler & Kafai, 2007, p.6).

Some games that are available for public use are the result of participatory design in which people from the target community participated in the design of the game. **Soul Control,** which addresses gang culture and crime for instance, emerged from a design concept developed by NEET youth who took part in games design course. Nintendo has also used co-creation to create game concepts for certain target groups such as children with learning attention deficit disorder (Walsh, 2009) and sighted children (Willems et al., 2011). Other developers have made game design part of the game, such as the **Gamestar Mechanic** (Gamelab) example discussed in the cases.

Prensky (2008) suggests two ways to let students take on the role of game designers: by involving them in the creation of mini-games that cover small parts of the curriculum or by engaging them in the development of complex course covering games. The first is generally more feasible, within the constraints of existing teaching practices, but a second approach is also being attempted, in innovative schools such as the one run by the Institute of Play,[106] and in the Aarhus College, described earlier.

Making games overcoming risks in relation to empowerment

Lim (2008) cautions that the many opportunities for strong learning engagement tied to digital games should not be taken for granted, suggesting they may fail to be empowering at all – digital game environments can replicate the power relations in a school, disempowering students. Active involvement in the design of the games intended for them and their peers is a way to overcome this, a point made more forcefully by, Prensky (2008) makes a more bold claim: "Because the next generation of educational games—the games that will truly engage and teach students—is likely to come from the minds of other students, rather than from their teachers. And it is likely that learners will relate to these games, and learn from them, in a way that is not happening today." (Prensky, 2008, p.1004-1005).

Game-making tools

The process of creating games is increasingly facilitated with the availability of game development tools and toolkits. Many of them are available under open source licenses. Some are intended to be usable by children such as Scratch, Kodu and Sploder. **Scratch**[107] for example, was developed by the Lifelong Kindergarten Group at MIT Media Lab and can be used not only to create games but also to tell interactive stories and make animation movies, and has a rich and active world-wide user community. Some more extensive game development kits also claim to require no previous programming experience such as **GameMaker**[108] and **RPG maker,** available in free and premium versions Other toolkits facilitate programming and expand creative possibilities but do require sufficient coding skills, for example, **Unity.**[109] In addition, some COTS games are constructed with the opportunity of user modification in mind and offer tools to create new levels or customize the game. Examples include Civilization V (Firaxis), The Sims 3 (The Sims Studio), Minecraft (Mojang), Skyrim (Bethesda Game Studios). Mods, modifications of these games made by players, are widely shared. More details of these tools are given in Chapter 3.

2.10.4 Summary of opportunities and challenges for different game approaches

Using these cases, along with other evidence that will be presented in the next sections, it is possible to summarise the main opportunities and challenges associated with each of the three types of digital game approach (Figure 6).

Each brings its own opportunities and own challenges, depending on the context and target groups:

- **Special-purpose games** offer opportunities for customised products and services targeting particular intermediaries, groups, and issues, and for industrial growth based on their production. Special-purpose games can be distributed via professional intermediaries, through the target population and localised across national markets creating economies of scale. However, they are not easy to develop, requiring skills that are not widely available, and the current market structure does not allow for sustainability of product or businesses in many cases.
- **COTS games** (both games and hardware) are generally entertainment games available on the open market, are familiar and highly engaging to certain target groups, and facilitate a range of learning and participation outcomes. However they do not provide for customisation and logging

105 The Intel Computer Clubhouse is a global network of over 100 Computer Clubhouse which "provides a creative and safe out-of-school learning environment where young people from underserved communities work with adult mentors to explore their own ideas, develop skills, and build confidence in themselves through the use of technology". http://www.computerclubhouse.org/

106 www.**instituteofplay**.org/ A high profile US non-profit game studio specialising in new models of learning and engagement., particularly through digital games.

107 http://scratch.mit.edu/

108 http://www.yoyogames.com/make/

109 http://www.unity3d.com/

of use, raise privacy issues (especially online games), and carry the stigma of being 'entertainment'.

- **Game-making approaches** are perhaps the richest approach, but require considerable expertise and resources by intermediaries deploying them. They provide strong platform for building skills and participation, and creative learning and expression.

In general, game-based approaches provide multiple pathways to support learning and participation. They can be deployed on many platforms, and integrated with face-to-face or online communities. However, there is low awareness and considerable scepticism: the form and potential of digital game-based approaches is not understood – even in areas of relatively mature knowledge and take-up, such as school education, adoption levels are low. Practical and institutional assistance is not widely available, and decision makers are slow to provide this support.

Figure 6: Opportunities and challenges of different game approaches

2.11 Adoption of game-based approaches and at-risk groups

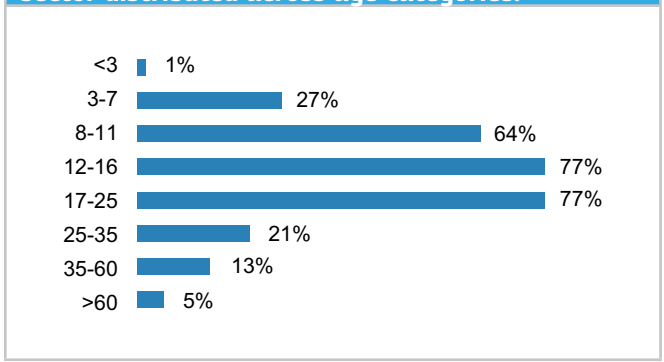
Having an offer of digital games for empowerment and inclusion does not guarantee that these games will actually be adopted and used. This section looks at some of the available data on general adoption of special-purpose games, and some of the drivers and barriers for adoption and appropriation by at-risk groups. However end users are perhaps not the actors whose adoption patterns are most important at this stage in the development exploitation of DGEI. The following section will introduce the role of **intermediary organisations** games, and we which we argue are best conceived of as co-creators and gatekeepers in the process of creating and exploiting digital game-based social inclusion practices.

2.11.1 Figures on the usage of special-purpose games

Figures on actual usage of special-purpose games across application domains, age and gender categories are rare. The following data are based on the Alvarez et al 2012. While these provide insight in trends in the global serious games market, they should be considered as indicative rather than absolute.[110]

The first target sector considered in the IDATE report is the **education** sector. Here, we see that digital games are still distributed physically, e.g. on CD-ROMs (63% vs. 37% distributed online). They are mostly played by pre-adolescents, adolescents and young adults. They can also be found among small children and adults between the age of 25 and 35.

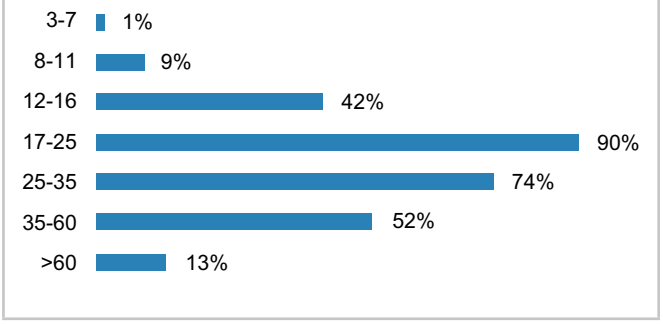
Figure 7: Percentage of players in the education sector distributed across age categories.



(Source: IDATE).

When we look at the **professional training** sector, most games are aimed at recent graduated and adults of working age. However, we also see that a significant percentage of players are minors. These games are thus also likely being used to prepare adolescents for their working life. Unlike games for education, games for professional training are predominantly distributed online (only 37% distributed physically). Here one could raise questions about the exclusion of people who do not have access to the Internet and who may need professional training.

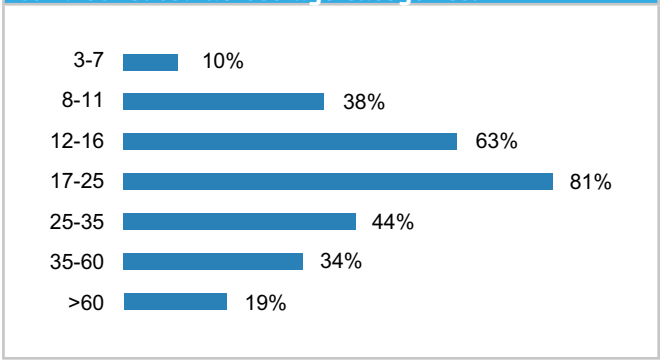
Figure 8: Percentage of players in the professional training sector distributed across age categories.



(Source: IDATE).

In the **health** sector, most of the games considered are also distributed online (63% vs. 37% distributed physically). We see that usage is spread out more across all age categories. Even amongst the elderly, we see a user percentage of about 20 %.

Figure 9: Percentage of players in the health sector distributed across age categories.

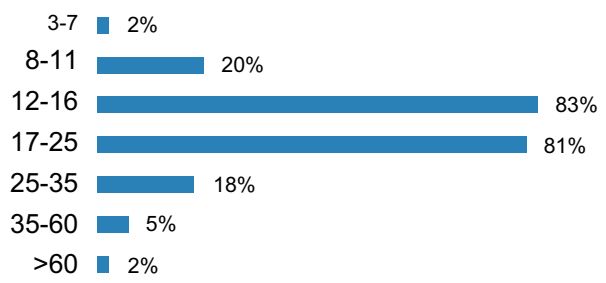


(Source: IDATE).

Within the **information and communication** sector (e.g. advertising, political communication), games are mostly used amongst adolescents and young adults. We also see a significant part being accounted for by children and the 25-35 age range. The elderly are underrepresented. One explanation could be found in the high number of games that are distributed via a web browser or as downloadable games (90% vs. 10% distributed physically).

110 It is not always clear how data such as the **percentage of players** per sector across age categories were determined and for which time frame they apply. With regard to data gathering, it is stated that primary data were gathered via interviews with decision makers in relevant sectors and that secondary data where gathered from public sources and other external sources, which are not specified.

Figure 10: Percentage of players in the information and communication sector distributed across age categories.



(Source: IDATE).

2.11.2 What shapes adoption

Different approaches are being applied to investigate adoption, the factors that shape it and the process itself. Positivist approaches appear to be more prevalent in this respect, but tend to focus on the isolated individual, not on the more socio-cultural processes complex processes that make digital game-based practices and techniques possible and effective. More research is needed on gaming practices in everyday life using approaches such as appropriation and domestication (Silverstone and Haddon 1996), how they are related to gender, age and class identity, and how they are part of a wide range of media ecologies and types of participation with new media (e.g. Ito and Bittanti, 2010).

When we consider **adoption of games by the general public,** it has been found that the following features shape adoption and use:

- Social norms and critical mass: People are more likely to adopt digital games if they feel this is expected from them by others and when they feel that many other have done the same (e.g. Ito and Bittanti, 2010).
- Enjoyment/flow: Not surprisingly, people are more willing to play a digital game that they find enjoyable in its own right (intrinsically motivated game play). The activity may be so absorbing that people's sense of time fades (i.e. flow) (Csikzentmihalyi, 1990; Hoffman & Novak, 2007; Chiang et al., 2011)
- Perceived learning, situated authentic learning: People are more prone to play a digital learning game that they feel will actually allow them to learn, and that sets the game experience in a game space that they can relate to (Bourgonjon et al. 2010).
- Control, encouragement and gaming experience: People are more willing to play a digital learning game when they feel encouraged to play and have experience with playing digital games.
- There are fewer and more committed genres of game participation: The latter seem to be more likely pathways to interest-driven learning, but are also those where exclusion issues arise (gender and generation gap, socio-economic divide).

More extensive discussion of factors shaping adoption is given in Bleumers (2013).

2.11.3 Digital games, digital exclusion and eInclusion: risks and opportunities for at-risk groups

Digital games are both cultural products and practices, and technological products. While often played on consumer devices, these can be thought of broadly as 'ICTs' - Information and Communication technologies. ICTs are recognised in research and European policy as both resource for empowerment and inclusion, or ' e-inclusion', for example providing access to knowledge, information, facilitate social integration, employment opportunities, and as the basis to realise major advances in social services, healthcare or education as recognised by the European i2010 initiative on e-Inclusion (European Commission, 2007). "e-Inclusion is basically social inclusion in a knowledge society... e-Inclusion should focus on people's empowerment and participation in the knowledge society and economy" (eEurope Advisory Group, 2005). However for individuals already suffering deprivation and social exclusion, then ICTs create new forms of exclusion, and set up a new 'digital divide' affecting cohesion and prosperity. In conventional thinking about value and use of ICTs such as computers and the internet a number of factors are commonly identified that constrain use, particularly among those at risk of exclusion (e.g. van Dijk, 2005):

- Limited home access: No or outdated hardware and software at home due to cost.
- Lack of digital skills: Limited opportunity to practice and build up new media literacy.
- Network poverty: Limited access to material, cognitive and social resources within a local social network and community (Stewart 2007).
- Negative experiences and associations with formal learning settings: At-risk groups tend to avoid public computer spaces or training facilities that are linked to formal institutions, (e.g. Selwyn 2004; Communities and Local Government. (2008a).)

For those at risk of social exclusion, non- or low use of ICTs is just one of many factors that constitute and reinforce social exclusion. Members of underprivileged groups, who have difficulty dealing with ICTs, run the risk of becoming further disadvantaged in terms of employability, health and civic participation. "The digital divide" is not only about access to technology, whether it be a PC with internet connection or a smartphone; increasingly important is that it's also about the plethora of ways we use technology and the consequences of that use. Thus eInclusion policies fall at the intersection of Information Society policy, and social cohesion and employment policy: policy to promote and ICT-economy and public services that both contributes to, and is in tension with policies of social inclusion.

A key question for analysis and policy is – to what degree does this analysis of digital divide and eInclusion apply to

digital games, and more broadly how may the use of digital games may contribute to inclusion or exclusion, particularly compared with more conventional ICTs – access to, skills and competences associated with the PC and the Internet. While digital games have some features in common with 'mainstream' ICTs they have some important differences that are little explored and understood. The way that digital games deploy narrative, play, multimedia and social interaction to motivate and engage complements the information and communication based facilities of other ICT, issues that are explored in this report.

Nonetheless, digital games do involve elements of technology use – mass market devices and products developed for other purposes – that bring with them risks of misuse that are shared with the use of other ICTs for supporting social inclusion and empowerment processes. In exploiting the potential of digital game-based empowerment, it is well to follow Haché & Cullen (2009) observations on the importance of ensuring that the use of any digital technologies including digital games, are framed within a suited pedagogical, trustful and meaningful approach. Because of the complexity of the social reality of at-risk groups, developing digital game based approaches to empowerment need to be based on (1) the actual game culture and digital habits of the targeted groups; (2) the social structures and activities in which the targeted groups participate; and (3) and (with relevant social groups), with a future oriented focus towards employment and additional training opportunities (Royle & Colfer, 2010; Steinkuehler et al., 2009). In other words, it is crucial to integrate digital game based approaches in overall inclusion and empowerment strategies and to ensure they are embedded in existing initiatives and approaches (Karabanow & Naylor, 2010).

This means that in order to obtain sustainable results, a project-based approach is needed in which the use of digital games is situated within an overall approach for inclusion. At-risk groups should hereby be considered as people with assets and skills, meaning as people that have knowledge and can contribute instead of approaching them as a problem to be solved (Royle & Colfer, 2010). Reducing digital-game based approaches to use of packaged games that are meant to mechanistically 'empower' people is not the path advocated in this report!

2.12 An opportunity for support of youth-at-risk and NEETs: Game-based inclusion

A key observation about the 'digital divide' is that it is largely characterised by **age:** in countries with high internet use, with young people in all social situations have rather high and not dissimilar use of contemporary mass-market ICTs (Guadagno et al 2012). Research by Karabanow and Naylor (2010) indicates that a vast percentage of homeless young people engage frequently with digital technologies, mainly to use email and play games. The same goes for NEETs (young people not in Employment, Education or Training) who use pay-as-you-go mobile phones for social networking, games and music (Royle & Colfer, 2010). General data on usage behaviour indicate that at-risk groups, and especially young people at-risk, show a more leisure-oriented use of the computer and the Internet (Royle & Colfer, 2010; van Dijk, 2005). Similar results are shown in the Ofcom children's survey. In the UK, over 80% of the children aged 5 to 15 are using some kind of gaming device and 23% of the children aged 12 to 15 are using their gaming console to access the Internet (Ofcom, 2011).

Thus, gaming is a normal part of the culture of young people at-risk. As such, the assumption is made that a **digital games strategy for inclusion could potentially be successful for youth at-risk:** "Games consoles (most now online and browser capable) would appear to be a natural conduit for reaching both engaged and disengaged teens. Likewise, social networking sites and social gaming and the casual gaming opportunities presented by mobile access have equal appeal." (Royle & Colfer, 2010, p.9) The same assumptions arise with regards to mobile platforms. Figures indicate that the use of mobile platforms and devices by young people has significantly increased. Hence, policies that aim to develop skills amongst youth-at-risk should also entail these opportunities (Haché & Cullen, 2009).

Populations of young people with a background of deprivation experience high drop out rates from education, low levels of self-esteem and a lack of confidence in personal learning capabilities, and lack a rationalized and self-motivating attitude which can lead to rejection of formal education. Informal and non-formal learning and training opportunities that make use of game-based approaches could be a way of re-engaging at-risk groups by overturning their negative experience and emotions associated with learning (Mariën et al., 2010).

Reviewing the survey of cases, most activity can be found around the support for youth-at-risk (see for example, the two case studies, Aarhus and LearnPlay, in introduced earlier). Comparing the type of interventions to reintegrate young people in the labour market and education described by Eurofound (2012), with the type of use of digital games, we find that there examples of game-based approaches in nearly all of the forms of NEET reintegration that Eurofound identifies (Table 21).

Table 21: Game-based approaches to NEET integration identified from practice

Measure	Aims	Examples	Game-based examples identified from practice
Measures to prevent early school-leaving	Improve students chances of staying in education, though holistic support within the school environment or at home	Greater parental engagement	Use of Games bridging home and formal education Games aimed at supporting parents Encouraging game playing between parents and children
		Policies targeting vulnerable areas	Game based initiatives addressing issues specific to a locality Alterative education services sited in particular areas.
		Career guidance	Games to help identify careers, and build employability such as interview skills
		Alternative learning environments and innovative teaching methods	Alternative education built round game-approaches (game making, learning through games) mainstreamed or in less-formal educational settings
Measures to reintegrate early school-leavers	Encourage and enable them to return to studies, or find alternative training	Second chance opportunities and alternative teaching formats (revitalising interest in education)	Alternative education built round game-approaches (game making, learning through games) In informal and non-formal localities and online
		Addressing complex personal issues (personalised programmes)	Game-based approaches allow for high levels of customisation and personal learning, and are used as part of personal support
School-to-work transition policies	Support transition from 'learning to earning'.	Information, guidance and counselling	Improved, personalised and interactive career guidance, including preparation for work
		Works experience and skills development	Training in transferable game-making skills Development of skills through game-based training
		Entrepreneurship support	Encouraging entrepreneurial attitude
Measures to foster employability	e.g. training addressing gaps in transversal and job-specific skills and competences	Apprenticeships and vocational training	Apprenticeships in game industry
		Training courses	Training in transferable game-making skills Development of basis and transferable skills through game-based training (using, making)
Measures to remove practical and logistical barriers to employment	Address barriers for young people from particular vulnerable backgrounds	Addressing special support needs	Help for young people with Autism, ADHD, and other physical and cognitive disabilities
		Facilitating mobility and funding	Development of skills for online work
		Employer incentives and subsidies	Working with game industry to provide apprenticeships

However, while digital games are being used to address the challenges of young people we need to be aware that the conditions and context also constrain what kind of approach will be suitable. The challenge lies in developing approaches that really connect to young people, and not just assume that since an approach as 'games' then it will automatically work. It appears that to achieve this, the key lies in following a project-based or integrated approach:

- that is accompanied by in-depth research into gaming practices of at-risk groups: what are they playing, how, where, when and so on;
- that carefully frames the game-approach, as 'serious labels' may give the feeling to the target group that they are being labelled, and the game approach that they are being patronised;

- that combines the added value of games with that of intermediary organizations who have a trust relationship with the target audience and guide them.

A major issue however is that little research exists on the actual and successful use of digital games by at-risk groups for broader inclusion or empowerment goals (Ortiz, 2009; Royle & Colfer, 2010).

2.13 Key stakeholders in DGEI practices: intermediaries and at-risk groups

2.13.1 Characterising social inclusion intermediaries

While characteristics of end user communities shape the creation, adoption and use of digital games, the crucial stakeholders are the social inclusion intermediaries that try to support those at risk of social exclusion, such as youth workers, social assistants, carers, teachers, health workers. Among organisations involved in social inclusion work, the third sector plays a key role, often picking up where formal, public services have failed. In many countries the third sector provides the front line of social inclusion services. In this section we consider the issues involved in inclusion intermediaries adopting games and developing game-based practices.

It must be noted that the 'third sector' should not be considered a homogeneous sector – it stretches from purely local voluntary organisations, to major international non-profit businesses, and is characterised very differently across Europe (Osborne, 2008; Brandsen, 2005). While much of the third sector is characterised by small, and precarious, project-driven activity, increasingly social enterprises are similar to private enterprise, and engaged in the delivery of social services, such as employability training under public contract.

Numerous studies acknowledge that **at-risk groups are difficult to reach via a one-on-one approach** (Emmel, Hughes, & Greenhalgh, 2006; Jehoel-Gijsbers & Vrooman, 2007; Liamputtong, 2007; Matthews & Cramer, 2008). The main reason for this is the absence of a trustful relationship between at-risk individuals and unknown third parties. Consequently, the best way to reach at-risk groups is via intermediary organizations that are already embedded in the immediate social and cultural context of these at-risk groups and hence, already have established a long-term relationship of trust with them (Haché & Cullen, 2010). Some examples of possible intermediary organizations are poverty organizations, health institutions, shelters and youth organizations. This has two major implications for the use of games or other types of digital tools and applications for inclusion and empowerment of at-risk groups. First, it means that implementing such tools needs to be realized in close collaboration and agreement with this type of intermediary organization. Second, and similar to the case of conducting research with at-risk groups, it implies that **intermediary organizations are gatekeepers** that have the power to accept or deny access to the at-risk groups they are working with. Formal organisations such as unemployment offices, social housing offices can hold power over excluded people, but may not be trusted or valued by those they try to help. Other organisations, such as community centres, may act as referral agents, with more trustful relationship with those they seek to help (Emmel et al. 2007, p.7). Informal gatekeepers come from the communities they represent, act as a bridge to 'new social worlds' (Liamputtong 2007:51). These gatekeepers can play complementary roles in introducing new services and techniques such as digital games, but also need convincing evidence and practical assistance to convince them to use or recommend game-based approaches, if they are not to reject them.

2.13.2 Drivers and barriers from an intermediary perspective

The literature review highlights the following issues shaping use of digital games in different settings of social inclusion intermediaries.

Adoption by intermediaries in formal settings

Digital game-based approaches can be applied in a wide range of formal settings where the institutions goal is to facilitate particular aspects of empowerment and inclusion – from rehabilitation centres, through school and colleges, to prison and youth custody. The formal setting where there is most experience of adoption of digital game-based approaches is however, in schools, an area reported on and invested across Europe by a number of EU projects such as ENGAGE, Imagine (Blamire 2010; Pivec and Pivec, 2009), and the European SchoolNet project on games in schools (Pivec and Pivec 2008). This research highlighted macro and meso level factors, such as fit to the **curriculum and assessment procedures, support to teachers,** localisation of games, and collaborations between industry, research and teachers, and stressed the need to focus policy on these issues (Blamire 2010). At a micro level of everyday experience of teachers, de Freitas (2006) identifies barriers such as lack of technical support, lack of suitable computers, no community of practice, lack of time to prepare effective game-based learning and costs of education licences. More recently, members of the GALA network of research on serious games have bemoaned the way that in much research on games for learning, a focus on the 'game' has overshadowed the role of the teacher, and suggest much more attention needs to be paid to the roles of the teacher in context, a context where the curriculum is the predominant element shaping "design, practice and assessment stages, guidelines on practice and the competences to be formed" (Arnab, 2012).

A targeted study by De Grove and Van Looy (2011) found that **perceived fit** of digital games with the curriculum in general and the structure of classes seemed to play an important role in acceptance that gender and years of

educational experience. When teachers saw games as more compatible to their teaching practices, they also tend to see more **learning opportunities,** felt more that games would be **easy to use** in the classroom (which referred to being able to handle the game as well as putting it to use) and would be more **useful** in that context.

De Grove and Van Looy conclude that **game-based approaches in the classroom could be stimulated in two ways.** On the one hand, teachers could be offered more experience with games as part of teachers' professional development. On the other hand, more work could be done on enhancing the compatibility of games and the education curriculum and structure of lessons. This could be accomplished in special-purpose games by taking functional and structural constraints of education into account, or by focusing on the constraints instead and thinking on how the educational system could be changed to accommodate the use of games.

Table 22: Issues and opportunities in adoption: teachers and other intermediaries

Factors shaping adoption of game-based approaches in the classroom:

- Compatibility between digital games and curriculum/ class structure
- Perceived learning opportunities
- Ease of use (both of the game and of the implementation)
- Perceived usefulness

Opportunities to stimulate adoption of game-based approaches by teachers and other intermediaries:

- Offering experience with games through professional development
- Enhancing compatibility between digital games and existing educational structure

The expert case of the Scottish **Consolarium** gives another example of support to intermediaries such as schools. Clearly more research is necessary in other types of formal use environments.

Implementing games for inclusion in a non-formal learning context

There is much less knowledge about uptake and use of digital games in non-formal contexts. Several barriers might hamper the take-up of digital games for inclusion by intermediary organizations. The literature and cases suggest three main barriers: **negative attitude** and **lack of knowledge** of how digital games can add value to their work; **limited financial resources;** and **tensions** between expectations of policy makers and needs of users.

First, a vast number of intermediary organizations are reluctant to integrate digital technologies in their service delivery because a significant part of their employees shows a negative **attitude towards the use of digital technologies** and lacks skills to use digital tools or stimulate others to start using digital tools (Mariën et al., 2010; Steyaert & Gould, 2009).

Though empirical data are lacking, it might be expected that a similar negative **attitude** exists **towards the use of digital games,** caused by the highly informal and playful character of digital games. Consequently, an crucial step is to (1) convince intermediaries of the added value of games or other digital tools for empowerment; (2) develop awareness and know how on how to use digital tools for inclusion and empowerment or other participatory goals and, moreover, integrate the use of digital technologies as a tool into the existing curricula of librarians, social workers or youth workers, as they are most likely to function as an intermediary for e-inclusion policy; and (3) invest in train-the-trainer opportunities that focus on the attainment of digital skills (Mariën et al., 2010).

Second, the majority of third sector organizations, especially those which try to use information technology as a key resource, have limited **financial resources** because they are subject to project-based funding. They already lack the financial strength to update their digital equipment, provide professional teachers or organize in-house train-the-trainer sessions (Mariën et al., 2010). The lack of financial resources additionally has a perverse effect on the sustainability and the long-term approach of inclusion. Currently, organizations are compelled to develop their programs and approaches in line with the consecutive project calls in order to get financing, which hampers the development of a long-term plan for inclusion (Mariën et al., 2010). The lack of resources makes the acquisition of digital games or the investment in the development of games nearly impossible. A solution might be to find more ways to stimulate the collaboration and enhance public-private partnerships between the game industry and third sector organizations.

Third, the increased focus of policy makers on empowerment and inclusion goals puts intermediary organizations in a **contradictory situation** – where social exclusion is defined as bad, and inclusion a worth striving for, to the point that it becomes and obligation Brants & Frissen (2003, p.8-9) Third sector organisations working with at-risk groups feel compelled to focus on the stimulation of different types of capital-enhancing activities because such usage behaviour is more likely to contribute to opportunities of social mobility (Hargittai & Hinnant, 2008; van Dijk, 2005). But the strength of third sector organizations lies in their user-centered and learner-oriented approach by which the issues raised by at-risk groups are valued and addressed (Mariën et al., 2010).

The usage behaviour of at-risk groups tends to be more towards leisure-oriented tools and applications (van Deursen & van Dijk, 2009).

This implies that third sector organizations are forced into a push and pull situation between the wants and needs of at-risk groups and the expectations of policy makers and funding organizations. Pushing a certain type or tool amongst at-risk groups in a top-down manner might cause rejection and result in drop out. Not pushing capital-enhancing activities enough might make policy makers and funding organizations accord less value to the activities of third sector organizations.

2.13.3 Acknowledging the crucial role of intermediaries: participatory approaches to game use and development

Different studies acknowledge the value of participatory approaches in IT-based social inclusion interventions (Sime, 2008; Sinclair & Bramley, 2010; Steyn & Johanson, 2011; Teles & Joia, 2011). Involvement of at-risk groups as full partners challenges the hopelessness and unchangeable nature of their precarious situation (Sime 2008).

An important question then is how to develop participatory approaches on digital games for empowerment and inclusion? In this regard, lessons can be learned from participatory research approaches with at-risk groups. This is little direct evidence, but approaches suggested by Liamputtong (2007), Sime (2008) and Platt et al. (2006) that actively engaged at-risk individuals in identifying problems and defining solutions offer pointers, Ownership and appropriation are also factors when novel approaches are tried out by outsiders (Warren 2007). This suggests that digital game-based approaches initiated by outsiders (1) acknowledge the role of intermediary organizations as a means to reach and empower at-risk groups; and (2) reflect on a participatory approach that integrates the knowledge, experience and network value of these intermediary organizations and their at-risk participants.

Table 23: Issues and opportunities in adoption: non-formal and informal learning settings

Factors shaping adoption of game-based approaches in non-formal and informal learning settings

- Attitudes towards ICT and gaming
- Financial resources for game acquisition, training
- Tensions between expectations of policy makers and needs of users.

Opportunities to stimulate adoption of game-based approaches in this context:

- Raising awareness of the potential of digital games for inclusion and empowerment
- Promoting knowledge of how to integrate digital media and games in existing practices
- Investment in digital skills training of intermediaries
- Public-private partnerships: Between game developers and intermediary organizations
- Participatory approaches: Acknowledging the role of intermediary organizations as a means to reach and empower at-risk groups; and (2) reflect on a participatory approach that integrates the knowledge, experience and network value of these intermediary organizations and their at-risk participants.

2.14 Knowledge gaps and recommendations for research policy

From the review of evidence, theory and practice with regard to games for empowerment and inclusion, the following knowledge gaps have been identified: areas in which there is no or only limited research available, warranting further investigation.

1. Game adoption, usage and experience by at-risk populations

To be able to successfully approach at-risk populations with game-based approaches, Much more knowledge is needed about the extent to which these populations are already involved with digital games, the games they are playing (game genres, platforms, …) and how they are playing them (where, when, with whom, …).

2. Game use for social change in formal, non-formal and informal learning settings

Academic research has mainly focused on the usage of games in the formal learning settings such as the classroom. More scientific inquiry into cases where digital games (or borderline cases) have been introduced to non-formal or informal contexts. Such studies should not only look narrowly at the role of games, but at all aspects of the development of game-based practice, and role, and requirements of professionals the organisations they work for, set standards, or fund activities.

3. Impact of digital games on empowerment and social inclusion

Although evidence is appearing of game-based approaches resulting in empowerment, few studies have addressed whether and how the use of digital games promoted re-engagement of at-risk groups in a holistic way. One challenge lies in the fact that stakeholders are still struggling with how impact assessment should be conducted. This appears to be an issue that is not particular to the domain of social inclusion. Research into using games for educational purposes has also been struggling with the 'transfer' question. How is what is learned during game play, or experienced around game play actually transferred to everyday-life practices? This has caused some authors to reframe the transfer question and to look into how gaming is situated into a broader set of practices, including learning. For instance, do we see that game use is accompanied by the acquisition of new media skills?

4. Interpretive research that contextualizes game use

There is only limited interpretive research (e.g. domestication (Berker, 2006), ethnographic tradition, …) looking to situate game use in context, in general, and in the context of social inclusion, in particular. It is crucial to expand research so that it not only focuses on 'the game' or 'the learning outcomes', but on the context of use, the culture of users, the role of intermediaries, decision makers, and policy makers that shape the appropriation processes, and ultimately create the conditions for successful and innovative use. For example, are intermediaries supported to integrate games in their approach, how are they guiding participants? Such information and its role should be documented more.

5. Benefits and risks tied to gamification

The use of game mechanics in non-game activities is only beginning to receive academic attention. It has been argued that more research is needed on the benefits and risks tied to the variety of gamification approaches that are out there.

6. Publication bias for studies with a positive result

Publications with no or negative results tend not to be published. However to understand good practice, negative results have to be made available the research audience so that we gain understanding in factors that contribute to failure of a game-based approach.

7. Crossing the research-market gap

There is a need for more knowledge on how to proceed from a research-based game to a sustainable product or service that reaches its target audience.

8. Methodology

There is considerable scope for new research, not only to obtain end results, but to develop methodology appropriate to the evaluation of digital games and gaming.

Improvement in conventional qualitative and quantitative methodologies;

Exploration of build assessment built in to the games, for example by drawing on the growing production and use of Game Metrics, by the commercial online game industry and;

Developing multi-level assessment and evaluation to satisfy the evidence demands of different stakeholders in 'real-life' situations where change and impact is developed over extended periods of time (often several years), that involve social learning and learning by doing in the development and application of game based methods.

2.15 Policy concerns: evidence of potential for widespread impact?

In order to judge the future value of game-based approaches, and directions for action there are a number of questions to ask of this evidence.. First, what is the potential for impact of game use at a macro-scale: could game-based approaches increase the overall effectiveness and cost effectiveness of social inclusion services. Second, how could effective game based practices be promoted and developed more widely, turning local innovation into systemic benefits. And third, what are the processes by which games and game based approaches developed initially, into order to understand if and how this might be supported? This chapter has presented evidence that can be used to discuss the first two points. The third will be explored using the cases and new evidence introduced in Chapter 3.

2.15.1 Effectiveness and efficiency

Two crucial issues for policy are effectiveness and efficiency. If game-based approaches are effective in doing what they claim to do, are they potentially more effective than other approaches, can they be considered cost-effective and are they more efficient in use of input resources than alternative approaches? Can we claim that using digital games will support empowerment and inclusion, systematically under real-life conditions, and that innovative game-based approaches are actually improvements over other, existing approaches (Hartley 2005)?

The cases reviewed, especially those with outcome studies, indicate that these approaches do seem to be effective. The examples of the Consolarium, Aarhus College, Starbright, At-risk, and In-living all demonstrate effectiveness against some types of outcome indicators (student referrals, reduced dropouts etc). The other cases, such as PING and Choices and Voices work in areas of communication and awareness raising, where engagement at point of use and at times afterwards stand as proxies for success in the short term. What is not clear is whether these approaches are more effective than other non-game practices. However, when looking at why and how they were commissioned and implemented, it is clear alternative existing non-game approaches were considered insufficiently effective: there was a need for innovation in the face of perceived weaknesses of alternatives, such as the high levels of drop outs from existing educational programmes, failure to engage people in awareness campaigns, or poor educational results from conventional education. Games use was developed to fill a perceived gap in existing practice. In these cases, while we cannot tell if a particular games-based approach is best practice in a particular field, evidence suggests that they can at least be good practice.

As for efficiency and cost-effectiveness, again this is hard to substantiate with evidence. Most of the projects reviewed were just that, projects, with initial investment in development of practice and games, but little or no long term assessment return on investment, or cost savings at point of use or systemically. The long run costs of training and support are not included in assessments. A couple of the special-purpose games appear to be sustainable commercial products (At-risk and Gamestar Mechanic), but there is little data on whether they are more cost-effective than alternatives for their customers.

The difficulty of evaluating systemic impact, and thus assessing overall efficiency of spending – where costs are saved at a different place to where the resources are used, is a basic feature of many public services and social inclusion policy particularly: failure to prevent ill health, or to prepare someone to get a job has future costs borne by different budgets. It is also hard to attribute impact to any particular intervention, when there are many alternative factors. However, if we accept the effectiveness of certain game-based approaches, then there is potential for efficiency gains over existing less effective practices which may have high costs of failure.

Digital games offer the potential for saving costs at the point of delivery – games are primarily software that can be distributed and used widely. Special-purpose games can help deliver a service more cheaply and effectively and to more people than may have otherwise been possible. At this stage of development and use, we should hold the door open to the **potential of digital game-based approaches to improve effectiveness of service delivery,** both in terms of outcomes for individuals, and number of people reached, and cost effectively compared with other interventions and services. **More experimentation and research is required,** not only on how to make game-based approaches effective in controlled studies, but effective and cost-effective in real life situations.

2.15.2 Scaling, knowledge transfer and replication

Given that we have a set of effective game-based approaches, and innovation systems that will create and improve these approaches (addressed in the next chapter), a second set of questions important for policy relate to the potential to scale initiatives, transfer knowledge and practice out of the original site in order to, replicate or re-invent in other settings and organisations, and eventually to mainstream these types of approaches (Albury, 2005). From a business perspective this would be the business and market potential, but from a policy perspective, our interest is whether, and how, locally effective services can be exploited more widely, with subsequent impact on indicators of social exclusion. Again, there is little robust evidence across the range of game-based approaches, in general, and from the examples presented in this report. However some tentative analysis can be made, using an approach based on a knowledge and technology transfer, where a continuum is identified from simple linear knowledge transfer, often packaged in a product or service, from producer to user, to a situation where

knowledge and practice is co-produced within a community of users, with various intermediaries shaping this (Howells 2006; Stewart and Hyyslo 2010)

The production of a packaged product or service online or offline, offers potential for scaling the delivery and impact of a service. In this way, the special-purpose games offer potential for scaling. At Risk, PING and Starbright represent services that can be used in hundreds or thousands of institutions – scaling is technically very easy. However, a key element of game-based approaches is that they require the inclusion intermediaries - individuals and organisations– to develop skills and knowledge in using a particular game-based approach, and to integrate the game part with other activities. Again, PING and At Risk, but also CivWorld and Gamestar Mechanic are examples of projects that have developed training packs for users, or have online support groups that seem effective, and demonstrate that in some cases this is sufficient and appropriate, and this is probably cost-effective way of proceeding. This formalisation of support has to be done in a way appropriate to the target user groups. Intermediaries are needed to ensure distribution.

In other cases, games are highly targeted, and customised, reflecting local values, issues and institutions, and are designed to be used alongside other training or support elements. InLiving and Choices and Voices are designed for particular organisations and local problems. This type of game can be re-customised by the developers, or made more generic and user-customisable, like most software-based products. Choice and Voices was developed to be customisable, and several versions were created, and At Risk for Universities was redeveloped for schools, and Starbright localised for a number of countries While each time this is done it this requires work with local intermediaries to do the customisation, and redevelop the practice of use, key elements are reusable, and the experience of re-customisation can reduce costs, and thus provide return on the initial investment for the developer/publisher/funder, and make the each subsequent re-development cheaper to the user organisation.

The provision of training and online communities represent simple, packaged knowledge transfer processes, allowing local use and practice around a single product or service to develop in many locations. Distributed users have no need to interact to develop practice and use. Although requiring more investment, the same can be said for the re-customisation of special-purpose games – where the game developer is the point of knowledge transfer. However for the use of COTS games and game making, this is a much more complex knowledge transfer and community of practice building process. In these cases, there are technical components, such as the games and consoles used in the Consolarium project, the Gamestar Mechanic software, or to mention another case, the use of Scratch as a game-making tool, where software can be simply downloaded. However the development of local game-based practice is much more demanding of local users than in the previous examples. Much more work and investment is needed by individual inclusion organisations to develop good practice.

The use of COTS games in education, for example, shows widespread, fragmented and uncoordinated use and practice development around game use, with attempts, often by policy and research, to bring together good practice models and encourage diffusion and uptake of these more widely. In these cases there can be a degree of central dissemination of practice, but also a degree of facilitation of experimentation and local innovation. There is starting to be evidence that online networks, local communities of users, and institutional initiatives that provide demonstrators, support and some resources can be effective not only at knowledge transfer, but at supporting a move from early innovative users to more mainstream practice. This need not involve a great deal of money. For example, the Consolarium in Scotland had minimal budget. Game-making practices may require some centralised tool production, but these can be made available for free or at a market price which is financially accessible to end user organisations (Scratch ; Gamestar, At Risk). The MIT Scratch project shows how a researcher-led project, using an open- innovation approach and online tools, is able to support a large community of users that itself generates a considerable amount of freely-available support material..

Finally there are other models of knowledge transfer. One can be the demonstrator effect – where a single initiative can be regarded as a good practice to be learnt from and there is potential to build a larger community of practice based around the demonstrator. Another is the role of the independent trainer and animator in game-based approaches, such as game making, who, unlike the game developer, does not have product or service that can be infinitely reused, but plays an important role in transferring tacit knowledge to new users, so that they can develop their own practice, local communities of practice, and participate in online communities of users.

These different approaches are summarised in Table 24.

Table 24: Knowledge transfer and service scaling			
Type of scaling or KT approach	Role of key actors and intermediaries in KT and scaling.	Role of Network in KT and scaling.	**Example** (those not cases in this report in brackets).
Unique development of practice	Core institutional actor implementing a game-based approach in one or several situations. Can act as a can act as a demonstrator and example of good practice to a wider network.	Learning from and sharing own attempts to learn from core demonstrator.	Aarhus College, LearnPlay.
Packaged game with training material and language localisations	A product with clear aims and simple to use can be distributed by developer and publisher consortium.	No need for interaction between users (but can occur).	PING, At Risk Gamestar.
Customised game and practice, redeveloped for different user and locations	Developer and publisher (which might be professional organisation in the field) transferring experience of development to new customers and user organisations.	No interchange between different user organisation necessary, though potential for bridging organisations to support transfer of practice.	InLiving, Choices and Voices.
Sharing of good practice and developing local expertise without a key product	Central organisation from the practice community provides resources and legitimacy.	Community online, and in local sites of use. Depends on ability to build local practice around initial enthusiasts	Consolarium.
Disseminating an approach and building local practice around a key game product	Developer of tools and approach provides a key animating role in distribution and community.	Online community of users, new local champions, and Local self-sustaining networks of users	Gamestar, (Scratch), GLS.
Individual game-making trainer providing courses and training	Trainer key point of knowledge transfer.	Potential for networking, to sustain practice from initial training.	(Gamestar(t)).

One notable feature of all these examples is the lack of centralised push policies to promote or mandate the adoption of particular games or game-based practice (except perhaps At Risk). Dissemination and appropriation of these games is sometimes funded or prompted centrally (Consolarium or PING), but is in general driven by end user organisations and individuals choosing to use a particular game or incorporate game based-approaches into their practice, voluntarily (e.g. Gamestar in the classroom or youth centre), or as part of a package of local institutional activities (At Risk). Data is not yet available on the long term use of games and game-practices. There is a concern that many game-based approaches are not consistently incorporated into practice. Even in one of the cases of systemic change, the Consolarium sustain use by teachers was difficult to find. A challenge is to find appropriate ways to enable consistent practice within different settings of use.

2.16 Summary

This chapter has used a review of the literature and original case studies to demonstrate that:

i. There is considerable use of digital games-based approaches in a wide range of contexts. The majority of work focuses on young people, but many other groups are also targeted ranging from children from deprived communities, NEETs, disabled people, the acutely and chronically ill both mentally and physically, elderly people suffering isolation, young people in communities with high crime rates, and issues of extremism and racism, and entrepreneurs in developing countries.
ii. Outcomes are varied and numerous, focusing on building self-confidence, social participation, basic and specific skills and knowledge, wellness and coping with ill health, and creative thinking and entrepreneurship.
iii. Game-based approach are not based on the design of a game that is used in isolation by an individual, but they are usually developed and deployed to support inclusion intermediaries from specialized and mainstream institutions in their work, games are often deployed in group work, and aimed at stimulating social interaction and the strengthening of participation and the social scaffolding necessary for successful empowerment.
iv. Games-based approaches are being used in all age groups, but there is a particular opportunity to reach young people at risk and NEETs who already have a high engagement with digital games and play.
v. There is tentative evidence to suggest that digital game approaches could be effective delivering improvement in empowerment and social inclusion services, and this evidence demonstrates there are many pathways to scale, replicate or disseminate use of games and game based practices, from centralised push to self organising communities of enthusiastic users.
vi. In the following section addresses the third issue of interest to policy the industrial supply and development perspective.

3. The Supply Side: Videogame, Serious Game and Special-purpose Game Production and Markets

The future of DGEI is not only in the hands of users and intermediaries, but will be shaped by broader industry and research trends. This chapter introduces, analyses and discusses two main industrial ecosystems, one established – the videogame industry, and the other emerging, the 'serious game and gamification industry', both of which can be considered as having an important role to play in the development of DGEI. This sets the context for closer examination of the particular dynamics and issues of developing special-purpose games – a form of 'serious game' for DGEI, using the original data from the case studies analysed in the State of the Play report (Bleumers et al 2012). Together these three elements make up the core areas on the supply-side that are relevant to understanding the challenges to stakeholders and policymakers wishing to engage with DGEI.

The chapter is based on the report Stewart and Misuraca (2012) The industry and policy context for DGEI: market analysis, future prospects and key challenges in videogames, serious games and gamification IPTS 2012, itself drawing strongly on De Prato el al 2010 Born Digital / Grown Digital and the IDATE Market Reports on Serious Games (2008, 2010, 2011), which are based on considerable, and unique data gathered from serious games companies.

3.1 The 'videogame' industry

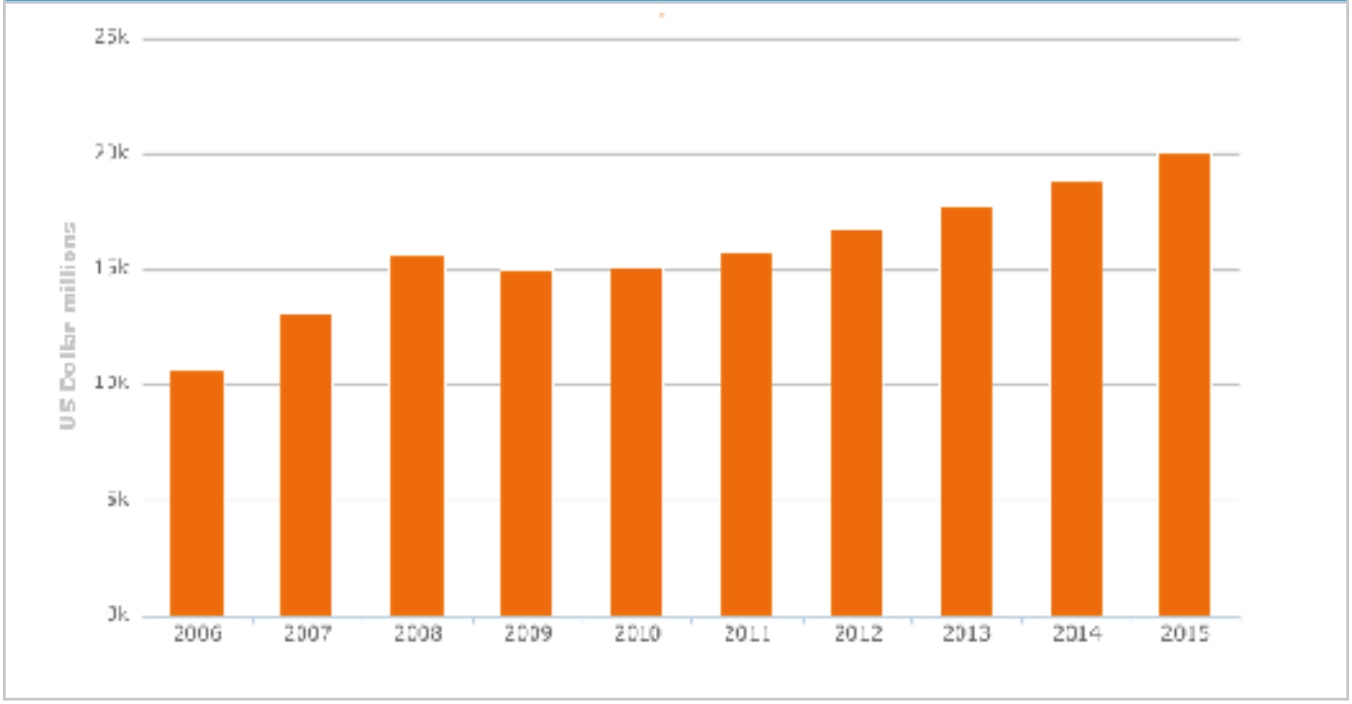
The digital game industry, or as it is more usually termed, the videogame industry is a mature industry, but highly dynamic and growing fast, currently worth over $56bn a year worldwide(PwC, 2009) and over $15bn/year in Europe (Figure 10). It has generated its own technological platforms which bring advanced technologies and interfaces to the mass market, including advanced 'AI', real-time networking, wire and hands-free game control, and makes a major contribution to youth culture, and culture in general.

The industry is highly dynamic and going through radical change, with new platforms, business models and customers. Headline figures for market growth mask the important changes in the market structure. NPD Group data on the US retail market for console games and (conventional) handheld games show a drop of over 30% in sale from Q1 2011- 2012, with a similar trend in the UK. In its place, mobile-phone and social-network based games are growing fast, and online games have shifted revenue streams and business model with the introduction of micropayments, subscriptions and advertising. IDATE (2012) data estimates that global online game revenues rose from €11,684 million in 2010 to €13,292 million in 2011, and are predicted to grow at a similar rate. IDATE (2012) predict that revenues of mobile games will grow to meet those of conventional handhelds. ISFE (2012) figures suggest that smartphones have overtaken conventional handhelds as devices for game playing in France, Germany, the UK and Spain, except in the youngest age groups.

The growth of the video games market is not only in terms of value, but also in terms of audiences. So-called casual gaming, as opposed to hardcore or the core gaming markets of enthusiasts, is capturing an up-to-now unsatisfied demand across generations, socio-economic classes and gender, and thus becoming mainstream across society. Recent US data puts female players at 47% of total game players,[111] with adult women a major growth market.[112]

directly to end users, is changing the business environment and creating a much less 'linear' value chain. Many 'casual' games, for the web browser and mobile phones also have much lower development costs than conventional 'AAA' games, and online channels to reach consumers cut out some of the intermediaries such as retailers. This is counteracted by the intense competition, and the powerful role of new intermediaries such as Facebook or the Apple Store.

Figure 11: Evolution of the European video games market size with estimated growth



Source: PwC, 2011

The video game production ecosystem is complex, involving the dominant hardware vendors, Sony, Microsoft and Nintendo, major publishers and their development subsidiaries, such as Ubisoft and EA, and a whole range of smaller development studios, middleware producers and companies providing services from video animation to testing. The conventional game industry has powerful distributors and retailers that have traditionally dominated the downstream end of a linear value chain. Many game development studios are business of high risk and innovation, dependent on publishers for finance, with cyclical business that create problems of cash-flow, recruitment, outsourcing, uncontrolled growth, and will control of marketing or relationship with end users (de Prato 2010). However technology and market changes (such as the shift from games as products to games as services (Sotamaa, & Karppi, 2010)), new forms of revenue, and the ability to sell and deliver updates, new features and advertising

Production of video games, from hardware, publishers, developers and services, is largely non-European and has even suffered decline in some sectors. Only the Paris-based Ubisoft is among the 20 leading global game publishers. This is important since funding for conventional game development has largely been controlled by the big publishers – digital games have considerable up-front development costs with small companies cannot bear, and thus have to give up IPR over their products. Nonetheless, across the games ecosystem Europe hosts many SMEs, either independent, or parts of global firms.

Change is opportunity for growth and diversification, as we see the emergence of strong European players in the 'new' digital games era. This shift in the market would appear to offer opportunities for growth of European business if suitably supported.[113] This interest is likely to be strengthened by a key aspect of this industry: i.e. its capability to succeed through investments in the development and introduction of novel

111 Entertainment Software Association figures http://www.theesa.com/facts/gameplayer.asp

112 ESA claim adult women are 30% of digital gaming population, and Mom Central consulting suggests nearly 70% of mothers play 'casual' games http://insightblog.momcentralconsulting.com/2012/02/moms-and-the-rise-of-casual-gaming.html

113 See for example Game Development and Digital Growth report from European Games Developer Foundation (2011)

technologies and service models. Later on, other industries could benefit, through service model and technology transfer. However, though more and more studies are trying to calculate the dimensions of the game industry, the lack of official data clearly constitutes a constraint to the appraisal of its potentials and to the understanding of its dynamics.

The European developer industry also faces the challenge of change and of competition from foreign competitors that are favoured by local conditions including policy assistance (See Section 3.10). While particular national and regional policy makers in Europe are supporting the games industry, European policy makers need to consider the potential contribution of the industry to both economic and cultural policy, and spill-over effects to other industries, and as discussed next, to the exploitation of games in non-entertainment sectors.

As Malte Behrmann, Secretary General of the European Games Developer Federation (EGDF) argues in his statement on the future "EU 2020" Strategy, the games industry is ''in the very centre of the digital shift. As the first truly digital medium, computer games have developed considerably over the last twenty years into an important content driven industry at the crossroads of culture, technology and economic growth. While being a so central link between those three areas, computer games have not yet received the place on the agendas of the European Union they deserve. The EU 2020 strategy is an opportunity to rectify some omissions of the past and to give the development of computer games in Europe more positive attention as a creative and cultural industry, deeply embedded in the digital economy of tomorrow".

A more in depth review of the state of the art of the video game industry, and the relevance to DGEI is available in Stewart and Misuraca (2012).

3.2 The "serious game" and "gamification" industries

While the leisure games market and industry undoubtedly provides the basis for widespread digital game playing and culture, and the genres, platforms and tools available to develop games, it is the growing development and use of special-purpose games for a whole range of 'serious' uses that is expected to provide an important input into the use of Digital Games for Social Inclusion. The videogame industry does produces COTS games that can be used in education, rehabilitation or made accessible to people currently unable to enjoy gaming, but special-purpose games – designed and tailored to support empowerment of people in particular situations or with particular conditions – are not going to be developed by this industry as it is currently constituted. The 'serious game' and 'gamification' industries may thus provide the source of these techniques and products.

'Serious games'[114] is being used increasingly as a catch-all term to include games and use of game technology in education and training, and military training and planning, (which both have a much longer history than the term), alongside emerging markets in health, wellbeing, advertising and communication and various non-formal education fields. Since the coining of the term in 2003 with the Serious Games Initiative in the US, there has been an ongoing debate about the definition and scope of the term. Susi et al (2007) highlight the tensions between those that stress the use of technologies of game production – such as development of virtual worlds with no game or play elements, and those that insist that a serious game must include at least some sort of 'game' element. So too are there debates over whether 'serious' games are by their nature, not fun, or whether the precise value is that they bring the 'fun', playfulness and intrinsically motivating elements of game play to activities with an instrumental outcomes. There are those, such as representatives of the mainstream game industry, who prefer the term 'applied' gaming, as if to distinguish it from a more 'pure' entertainment gaming. Other terms in common use include Digital Game-based learning, Games with an Impact,[115] Games for Good, Games for Change, and Games with a Purpose[116] to name a few.

However none of these terms has captured the imagination so much as the term 'Gamification', a sufficiently vague concept that has served to reinvigorating some of the serious game work, which may be too serious, Gamification focuses on how to exploit the gameplay elements of digital games in applications that are not digital games, but in practice implementations are frequently based in online services and mobile apps. In 2012, Gamification ideas, long used in weight-loss and child motivation, are attracting considerable interest from consultants and policy makers linked to ideas of 'nudging'. However it is not immediately clear whether those with the expertise to develop gamification are game designers or have any relationship with digital games development, and whether the tools of gamification can be considered part of 'serious games and gaming'. However discussion of gamification often end up addressing 'serious games',[117] and proponents of 'serious games' are starting to appropriate the term to promote their own work. As Escribano (2012) suggests, conventional and low key use of game approaches has taken a technological turn. One of the key popularisers of the idea through her games and publications is game designer Jane McGonigal, who explicitly developed the idea in developing an online tool with game-

114 Objections are raised to the term on the basis that 'games cannot be serious', or that 'all games and play are serious'. Some prefer the term applied games and gaming. Some firms are dropping the term game because of the negative connotations. No term is satisfactory, but 'serious' is currently a useful label. For a discussion see (Rockwell and Kee, 2011)

115 E.g. The Center for Games with an Impact http://gamesandimpact.org/

116 GWAP website http://www.gwap.com/ "When you play a game at Gwap, you aren't just having fun. You're helping the world become a better place"

117 For example http://www.reuters.com/article/2012/06/26/us-pharma-games-idUSBRE85P0IW20120626

based techniques to promote personal empowerment, using the resilience approach.[118] Clearly, the current trend of gamification is closely linked to the potential of ICTs, and the rich tools of digital gaming, and the popularity of the gamification idea focuses attention more clearly on the game like motivational elements of 'serious gaming' rather than the technological elements.

In this report we have steered clear of describing special-purpose games as 'serious games', but in terms of discussing the emerging market we will use the term **'serious game and gamification'** industries a collective term for organisations researching, producing products, conducting research and providing services related to digital games for a variety of client sectors, since these are currently the most commonly used terms, even if contested. Sometimes this will be referred to just as the serious game industry, since this is the term used in most of the literature in recent years. While there are firms from the videogame sector operating in this area, and researchers developing technologies, techniques and analysis, it is as yet a fragmented and emergent industry and market. There is no clearly functioning market in many sectors, with defined product and service qualities, competing suppliers and active users. Some markets are better defined, such as e-learning and advertising but even in this area the quality and supply of digital games is still patching and of variable quality.

Nonetheless, there is an increasing (self) recognition of the sector, or at least the recognition of the value of a common brand such as "serious gaming". Alongside a strong industrial component in North America and in East Asia, there is growing activity in Europe. Actors in the field are starting to organise themselves, setting up trade associations, conferences, and researchers have created networks researching serious games, two of which have been funded by the European Commission. Much of this effort is being focused on exploring, demonstrating and developing the potential to apply advanced game development techniques in a whole variety of non-leisure contexts.

Some of this is cross-cutting: research focuses on understanding how different game elements influence behaviour, and games can be used, and development of common tools is needed for example, for collecting data on game user behaviour. Many of the techniques for producing engaging and motivation games can be common across use sectors. Inputs and services, such as animation, graphics, testing etc can be provided by firms serving the videogame market. However, there are also considerable sub-sector differences, with widely differing the knowledge and resources needed to satisfy customers. Games for wellbeing and healthcare require very different knowledge and access to markets than do games for school education. The establishment of codified knowledge, the integration of game-focus knowledge with domain focused knowledge remains a challenge and fertile area for exploitation.

One of the few sources on an aggregated 'serious game' sector are the IDATE industry reports from which the following figures are drawn. Alvarez et al (2012) estimated the global 'serious games' market at €1,500 million in 2010, predominantly in North America (€1,050 million v. €330 million in Europe), and predict strong growth in North America compared to Europe, especially in the health sector, and in the heavily government financed defence sector. However it is the games for advertising sector that Alvarez et al (2012) estimate to be the largest (€300 million). The market consists of both consumer and business markets, but is predominantly to business, and to key accounts commissioning specially developed games.

3.3 The digital serious games and gamification market: demand sectors, customers and users

Today, digital serious games are employed in a wide variety of sectors, and for a range of uses as (Sawyer and Smith, 2006) from defence recruitment and medicine, to corporate training and planning. Alvarez et al 2012 note that games are being developed in the sectors of such as agriculture, culture, energy, social services, environmental protection, and training, but focus on defence, healthcare, formal education, corporate training, and information and communication as the key markets. Here we summarise activities in the main areas of production and use highlighted in the, 2012 report and in other work in the field: Defence, Education, Training and Recruitment, Information and Communication, Health and Wellness, Science, Culture, Activism, Policymaking and Corporate Planning.

3.3.1 Defence

Defence is of the most important markets in terms of client investment and orders, for training and planning products and recruitment. An early example, America's Army, a video game recruitment tool developed by the U.S. Navy MOVES Institute[119] (Zyda 2006) and distributed free-of-charge over the internet is considered the first ever significant digital serious game, with over 17 million downloads recorded in 2004. Serious games are also used by the military in Europe, though less widely than in the USA. They are used in all manner of training, from learning new drills, to language learning. Simulations are used for medical training, training on complex equipment, in aviation, in battle simulation and

118 See the website of SuperBetter https://www.superbetter.com/ and talk on TED http://www.ted.com/talks/jane_mcgonigal_the_game_that_can_give_you_10_extra_years_of_life.html

119 https://www.movesinstitute.org/

for personnel rehabilitation.[120] Games blur into professional simulations at the high end of the market, and at the low-end appear simple 2D games, but overall offer a cost-effect approach to training in a post-cold war budget era (Roman & Brown, 2008). Their value is recognised in training of recruits who may come with low literacy skills but high game playing skills. The US Dept of Defense launched a $50 million 5 year programme of game development for recruit training in 2010. The amount of money invested in this sector makes it a key market for the development of techniques and strong supply sector. Games are funded through public procurement and research grants.

3.3.2 Education

Use of digital games in the education sector is one of the oldest applications of games. From the supply side they can be developed as part of an educational publishing business, and more recently, the elearning industry. However, educational games, according to the report of the EC Engage project,[121] have always been "low budget, low tech, poor cousins of the computer game industry. Up until recently, very few commercial companies have provided good quality educational games. Historically, these games have been written by teachers and academics who wish to utilize the technology within their teaching, but usually do not have the skill, not the finance, to create a high quality product". This is changing with new expertise, tools and changing business models for distribution. Games in education can be replacements for textbooks and other media, or tools for game-making and a more radical gamified approach to teaching and learning. Serious uptake in the formal education sector however, depends on significant innovation in practices of formal schooling, and in the procurement and certification systems for education products. Procurement processes were citied by a range of contributors to the DGEI study as a significant barrier to adoption. Closer analysis of the dynamics and barriers to adoption in the education sector in Europe (public education) has been made by the projects IMAGINE (Pivec &Pivec 2009; Blamire, 2010) and ENGAGE.

3.3.3 Training and recruitment in public and private sector

Digital gaming is attracting strong interest in the field of professional training, an area already heavily committed to elearning. Alvarez et al (2012) estimates only 1% of total €52.6bn elearning market is in digital games. Simulation products are being custom made for professional training for managers, and game approaches developed for basic training of employees (e.g. eSmart, a €2.2 million training tool for Macdonald's employees on Nintendo DS aimed at cutting training time in half for part time works in Japanese restaurants.[122]) A growing market is helping supply firms develop portfolios of products and expertise to be customised to a growing market. Non-digital recruitment using games is also being shifted to Gamification and is also a hot topic and driving interest in corporations, not only related to training but also to **motivation at** work. Leading companies in this field include PIXELearning in the UK,[123] developing simulated environments and serious games for business education and U&I Learning,[124] specialising in eLearning for business formal and informal education based in Belgium. Recruitment is also being undertaken though games.(Sitzmann, 2011). For example, the L'Oreal group are one of the highest profile employers to go down this route, with the **Reveal** business game[125] developed by TMPNEO.[126]

3.3.4 Information and communications

Games that 'convey a message', the majority of which are commissioned **adverts** (81% in 2010 according to Alvarez et al (2012) estimates), although **public-information campaigns, political advertising** in election years, and activist campaigning are a growing use of games (see below). Uses are also being found in **policy communication,** both from policymakers and towards policy makers. Games are a core part of contemporary online and mobile advertising to children and young people, and this is one of the more developed markets.

3.3.5 Health and wellness

Health education games also appeared in the early days of digital games, but, like many applications of technologies, it was military investment that kick started serious investment. The market is currently divided into products aimed at wellness, such as fitness or dieting, or prevention of ill health, products for rehabilitation (which overlaps with the previous section) and products for professionals, for example simulations for training. In the mainstream consumer market Nintendo has enjoyed considerable success with applications dedicated to 'brain training' and 'fitness'. According to a SharpBrains[127] study, the market for brain and fitness products was $295 million, in the USA alone in 2009. However there also important growth in specially-made games, and gamification aimed at consumer and professional markets, and there are an increasing number

120 See for example the work of the Human Factors Integration Defence Technology Centre at the University of Birmingham, UK http://www.birmingham.ac.uk/Documents/college-eps/eece/research/SeriousGamesattheUniversityofBirmingham.pdf

121 European Network for Growing Activity in Game-based learning in Education project http://www.engagelearning.eu

122 SERIOUS GAMES MARKET blog MAY 8, 2010 http://seriousgamesmarket.blogspot.com.es/2010/05/nintendo-gets-serious-about-serious.html (accessed 11-2012)

123 http://www.pixelearning.com/

124 http://www.uni-learning.com

125 http://www.loreal.com/_en/_ww/html/careers/Meet-us/Business-Games.aspx http://www.reveal-thegame.com/

126 http://www.tmp.com/upload/library/2780_L'Oreal_Reveal_Case-Study_2010-04-07_APPROVED.pdf

127 Sharpbrains an "independent market research and innovation think tank tracking brain fitness and applied neuroplasticity research and marketplace." http://www.sharpbrains.com/

of controlled trials of game-based therapies in physical and mental health, and positive systematic reviews that will drive professional acceptance There are some major investment such as the n $8.25 million national program of the Robert Wood Johnson Foundation (RWJF) in the US.[128] Game interfaces such as Wii and Kinnect have been seized upon as low cost alternatives to expensive professional equipment. Gamification of weight-loss and fitness are well established practices. Alvarez et al, (2012) predict this sector will be the domain of strongest growth, especially driven by US healthcare industry, and consumer wellness market, though wellness and health can be a complex and expense market to serve, given presence of medical gamekeepers, and the costs of trials.

3.3.6 Culture

Although this sector only accounts for a minor part of the serious gaming industry at present, strong growth is possible, particularly in the areas of cultural heritage, education and tourism, areas where mainstream media has traditional played a strong role, education plays a key role, and audiences are large. The Nintendo DS is commonly used as a learning tool in museums and galleries in Japan[129] and multimedia gaming installations are a feature of many museums and galleries across the world. 'Serious' games in this area does not of course detract from the fact that all videogame are cultural products, and part of contemporary culture.

3.3.7 Science and scholarship

Games are being used in science and scholarship in a number of ways, including science education, science communication, and in 'crowdsourced' and citizen-led science, where game-like design and gamification is used to motivate non-scientists to collect and analyse data (e.g. search for astronomical features (GalazyZoo[130]), decode protein structures (Foldit[131]), or collect environmental data). Products here are generally developed though research budgets, but some are organised through generalist scientific publishers and public-interest broadcasters.

3.3.8 Activism and games for change

Until recently this sector has not followed traditional economic models: titles are produced with little or no financial backing and have the sole objective of putting across a particular message, or stimulating social action and/or collaboration. The Games for Change movement, embracing digital games, pervasive gaming, and gamification includes use of 30 second games to put over political messages, to long term gaming projects that engage and build communities. Games for change are also being explore in other areas of behaviour change – such as around energy use from raising awareness to using competition between neighbours to reduce consumption. This is being funded with public and private money, and is a key area of innovation.

3.3.9 Policy making and corporate planning

A final area of activity is the development of games that support management, complex policy-making, and organisational decision-making. Simulations, building games, and role playing games can help discussion and decision making between multiple stakeholders, and training of people to work in this sort of activity. Examples include the game for large-scale urban projects Construct.it (TU-Delft University).[132]

For longer exploration of use of games in different application domains see State of the Art Report (Bleumers, 2012) section 2.3.

3.4 Actors, value models and production approaches in serious gaming.

3.4.1 Market actors

The serious game industry is polymorphous as it groups together all the niche areas and markets that employ video games for objectives other than pure entertainment. The actors in the serious game market are diverse and fragmented, i.e. there are few clearly establish markets. There are some software developers, simulator developers, elearning companies, some game developers, pharmaceutical companies, public and broadcasters, advertising and marketing agencies, interactive media developers, university research, book publishers education and health organisations, development agencies, as well as pure-play serious game companies, often specialising in a particular market (education, health etc) etc The military and government are the two main serious game backers of projects in the USA and it is principally driven by the UK, Scandinavia, Germany and France.

There are a range of **promoters and investors** from the private, research and public sector that provide supply-side investment to develop capacity, products, tools and evidence to kick-start the nascent market. These remain key in a market where there is still a high level of experimentation. Key in communication markets are Marketing agencies and media companies who order games. Media companies are increasingly commissioning 360 degree programming, with TV, online and other interactive such as games, In

128 http://www.healthgamesresearch.org/

129 http://seriousgamesmarket.blogspot.com.es/2010/05/nintendo-gets-serious-about-serious.html (accessed 11-2012)

130 http://www.galaxyzoo.org/

131 http://fold.it/

132 http://cps.tbm.tudelft.nl/node/248

particular, this can include **public sector broadcasters** with a mandate to produce public-interest media, and who commission interactive material. Alvarez et al (2012) also note two very recent trends: the emergence of **serious games executive producers** coordinating developers, content and solution vendors, and the direct commissioning of projects and products from end users industries, rather than through intermediaries.

3.4.2 Production

Alvarez et al (2012), the IPTS Expert Workshop, and the State of the Art report (Bleumers, 2012) identified three main modes of production and connection between developers and users: a **product-based, a project-based** and a **research based** approach.

The **Product approach** applies where a developer creates a product that can be sold or distributed in a market. This follows a model similar to the conventional video game industry, with developers, publishers and a process of distribution. This is relatively rare in the serious game market, expect in elearning. The distribution process can also be different: products for education and health are often bought through procurement processes that distance the end user organisations from the process, making the procurement agencies the key distributing agents.

The **Project approach** applies when a network or consortium of organisations work together to develop a product, service expertise and the use of the product or approach, usually by some of the partners. Serious games are thus developed in a co-production regime, where specialised knowledge and skills are needed from a variety of actors, with the resulting management challenges (Den Hertog 2002). Alvarez and Michaud (2008) identify three project modes: order-based, licence based, and consulting and training. All three involve considerable original work with clients. This makes it harder for suppliers to build sustainable businesses reusing tools, components and other IPR. The project mode of work dominates because of the emerging nature of the use of digital games, and the specialist nature of many of the applications. Each project is an experimental process, where the developers are learning about client needs and the potential for games in the particular application, and the customers are also exploring the potential of games, the impacts they can have, and how they can be deployed. This can be a long a risky social process, raising the barriers to entry by developers and user organisations.

A particular model of development of project based Serious gaming is **research-led innovation and implementation,** a type of project approach that is includes development of digital games, but where a research agenda dominates, and the output may not in digital games used in practice, but research knowledge related to the application area, or technologies and techniques tested in the project. This is still one of the most significant forms of activity in the field, where partnerships of end user intermediaries, technology firms, games developers and other specialist organisations work to implement serious gaming in a specific context. In this case the challenge is not only to achieve successful local implementation, but transferable knowledge and technologies that can be reused by partner organisations in other situations.

In the current market, dominated by project and research-led development, Alvarez el al (2012) highlight the importance of **Promoters and investors** from the private, research and public sector who provide supply-side investment to develop capacity, products, tools and evidence to kick-start the nascent market. Other types of market and innovation intermediaries are also playing a role – from consumer electronics manufacturers to media buyers and public broadcasters. Alvarez el al (2012) also identify the emergence of **executive producers** coordinating developers, content and solution vendors,

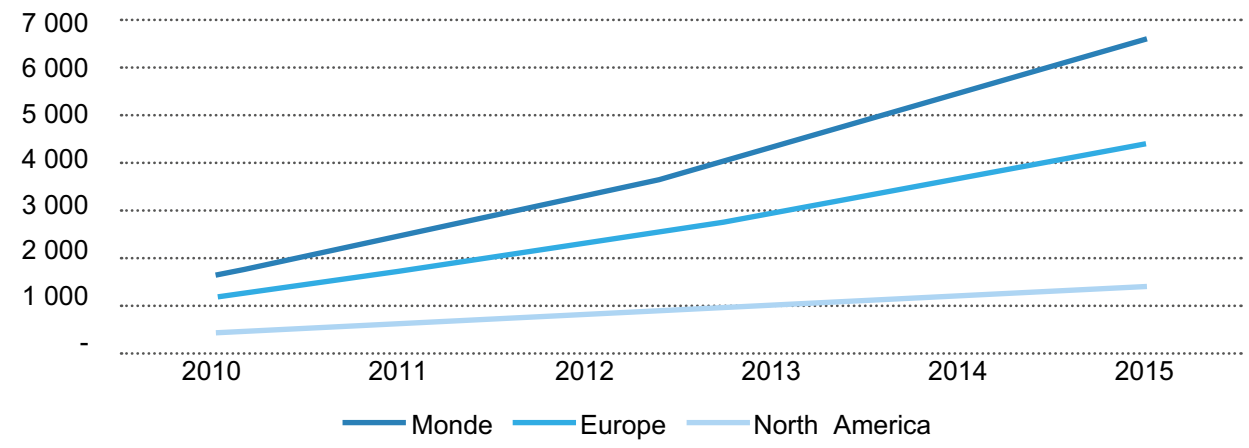
3.4.3 Market size and projections for serious gaming and a serious game industry

Alvarez el al (2012) estimate the worldwide turnover of the digital serious games sector reached €2.35 billion in all segments combined for 2011. The United States alone accounted for more than 70% of the income generated at global level. Within the European context, France is one of the most dynamic players in the digital serious games market. This was especially driven by a promising economic landscape in the domain and government (see section on Policy) funding for serious games specific and digital games projects, at regional and national level. The overall revenue of the sector was estimated to reach €47 million in late 2011.

The potential for growth is significant, since the reference markets (health, training, education ...) are a combined worldwide turnover of about €5,000 billion. Alvarez el al (2010) forecast significant growth in the medium term: by 2015 sales could be almost seven times what they were in 2010 – with an average annual growth rate of 47% between 2010 and 2015. However the more recent analysis and estimate of the market (Alvarez el al 2012) find that during 2009-2010 the market is estimated to have dropped by one third in part, probably due to the effects of the financial and economic crisis, but also justifiable by the 'stabilisation' of the sector (and especially in the area of health and training) and the search for increased quality. Budgets for individual products increased significantly and smaller projects dropped. The sectors of health and training have also benefited from considerable stability due to strong roots in research, and high investment in R&D, particularly by the EC.

In terms of volume of sales, all the target areas are affected by the decline in relative terms, while the areas of health and vocational training strengthen their presence and role in the market. The evolution of business models for services underpinning the serious games, their increasing relevance and sustainability, the maturity of the offer and

Figure 12: Evolution of the digital serious games market worldwide 2010-2015 €m



Source: Alvarez el al, 2012

the clear expression of the users' needs, can explain in part this phenomenon. The nascent state of the market is characterised by continual development of business models.

3.5 Supply of game-making tools

The third main approach to using digital games in empowerment and social inclusion is through game making. We also see serious games being developed on low budgets, and by relative novices. Thus both the production of professional special-purpose games and game-making approaches depend on the availability of a set of tools that can be used to implement the design of a game, and if relevant, distribute it. While graphics, sound and video can be created with generic tools, the creation of games requires a game engine, and authoring tools create to the game.[133] Unfortunately research evidence on the 'middleware' in video games is rather weak in this area (de Prato 2010), but there are five main sources of tools for the creation of digital games that can be used by individuals and intermediaries, and novice developers that can be identified:

1. Commercial and opensource tools for producing multimedia products, widely used to create 2D games (e.g. Multimedia Fusion, Stencyl, Gamemaker, often specifically designed for ease of use);

2. Specific 3D commercial game development tools for 2D or 3D games such as Unity3D, the Epic Games Unreal Development Kit (UDK), Torque;[134]

3. Programming development kits that focus on audio-visual content;

4. Special purpose tools for creating education games and simulations such as Thinking Worlds by Caspian.[135]

5. Special-purpose game and interactive media tools for children's education and training purposes, such as Scratch for PC (MIT), Kodu for Pc and Xbox (Microsoft) or some games that include game making within them e.g. Gamestar Mechanic.[136]

Of concern for the development of serious games and DGEI in particular is the availability, source, support and future of those tools. More tools in category 4 would strengthen both professional and intermediary game-production in particular sectors, reducing costs and training needs. These tools need not be only about manipulating media and game elements, but provide support on pedagogy, built in evaluation etc.

For game-making approaches some of the tools, such as Scratch, developed at the Lifelong Kindergarten Group at MIT Media Lab emerge from universities, and are freely available, with vibrant professional and user communities. Scratch has also been localised into many European languages. Microsoft's Kudo is free to use, has English and Spanish resources and a nascent 'Kudo cup'. On the professional tool side, the industry has embraced the educational context, and is starting to make advanced tools available, either free under non-commercial licence (e.g. UDK[137]), a low cost (e.g. Torque3D[138]) or through limited version and programmes of

133 http://gamesined.wikispaces.com/Game+Creation+Tools and http://www.ambrosine.com/resource.html for lists of tool for education and non-programmers.

134 http://www.garagegames.com/

135 http://www.thinkingworlds.com/

136 http://gamestarmechanic.com/

137 http://www.udk.com/licensing

138 http://www.garagegames.com/products/torque-3d

promotion to schools (Unity3d[139], GAMESTUDIO[140]). These platforms have user and teacher support communities, but the majority in English language. Many commercial games provide 'modding' tools for the creation and sharing of user-created content for commercial games.

In addition to screen-based digital games, game-making approaches have gone beyond conventional digital games and incorporated robotics, building on platforms such as LEGO Mindstorms, and LEGO products integrating with Scratch. LEGO and other Robotics competitions[141] are now widespread, and recognised as medium not only for education, but also for participation (Rusk et al, 2008). The availability of low cost opensource electronic controllers such as Arduino and now super low cost computing devices such as the Raspberry Pi means that this approach is very advanced in terms of platforms from both open source and commercial players, and for children and adults.

3.6 Challenges ahead

The players in the emerging digital serious games sector are currently addressing some major industrial challenges. The value chain is changing, especially in the upstream production layer, due to the introduction of high-quality production tools. Quality of production is also is increasing thanks to the integration of specific domain-related skills in their teams and specific expertise from the video game industry, and developing project management experience. Alvarez el al (2012) suggest that issues related to hosting platforms, distribution, marketing and deployment of digital serious games are being tackled with the aim to structuring and 'pooling', at best in a standardized framework, downstream in the value chain.

Just like its parent the video game industry (though the parent may deny the legitimacy of descent), digital serious games is a cross-platform industry. While currently products are in the main deployed on personal computers, it will certainly expand onto new generation consoles, and mobile and online platforms. Metrics used to optimize online gaming and maximize revenue can be used instead to evaluate use and behaviour and maximize impact. However this needs to be done in a much more scientific manner with goals of learning, behaviour change etc that go well beyond customer loyalty or repeat spending, and with considerable care over interpretation.

Within this highly and rapidly changing context, we can identify key challenges to be addressed (based on Alvarez el al (2012), summarised in Table 24), which are similar to the development of the interactive media industry as a whole, indentified by UK Skills (2011): "Bringing technical and creative talent together; to understand each other's language and skill-sets, to explore new types of content development, business models, and [develop] legal and collaborative frameworks" (UK Skillset 2011). In other words, how to sustainably create good products and services that are useful and actually get used. Integrating the analysis of Alvarez el al (2012) with the analysis and findings of the State of Play review (Bleumers 2012) and the IPTS expert work the following challenges are identified and discussed.

1. Reshaping the gameplay for non-leisure applications

While a strength of digital games is the ability to bring players slowly into the gameplay and train them in basic skills, slowing increasing and expanding them though different levels and tasks, many game genres, based in a generation of classic computer games assume players have knowledge of basic rules, aims and interaction (mechanics), and the support of a gaming community to master them. For new audiences, and to reach non-games, game designers have to take a lead from the casual game market, and simplify mechanics and gameplay. Close work with professionals in target sectors, and user-centre interaction design will be needed to address particular target groups and needs (e.g. people with particular pathology in the design of a therapeutic game).

2. Automating a portion of the production process, particularly the integration of sector-specific elements

Production process for serious games is far from streamlined. Product and service teams in application areas have to integrate human and technical resources from the video game industry into production of serious games. Special purpose tools that facilitate game creation for particular sectors, embedding both game design expertise, management of media assets, evaluation tools, pedagogical elements can improve the speed and quality of production, and reduce costs.

3. Building multi-skill teams and organisations to create serious games and gamification.

As well as tools to facilitate production, human capital is essential. This requires teams with skills from game development, the application domain and business skills to manage and sell into the user markets. This is a challenge both for game developers wanting to move into serious games and gamification, and for development teams from without game experience wanting to develop games, and perhaps a key challenge to the whole industry. Some organisations may be able to incorporate full teams of professionals with a range of skills relevant to game design, (game play design, software, creation of visual and audio content for game platforms, and mastery of the new platforms and tools for game design and distribution) with application specialists, but in many cases this will require project based teams from access cross-organisation, with

139 http://download.unity3d.com/education/

140 http://www.conitec.net/english/gstudio/

141 E.g. http://www.usfirst.org/roboticsprograms/frc (US FIRST ROBOTICS) http://fllopen.de/ FIRST® LEGO® League Open European Championship

the resulting management challenge. For existing games companies who see new revenue streams in serious games, there are also challenges to repurposing existing assets and platforms, which may require considerable learning and building of new competences

4. Training and educating people to work in serious games and gamification

Another challenge is to train people who are able to work in serious games and these multi-skill teams. This requires trained graduates,[142] not only prepared to design games for the entertainment sector, but willing and able to work in other roles – in interactive media design companies producing special-purpose games, the health sector, in schools and vocational training and defence. There are obvious difficulties in this a) many people work in game development technology or publishing because they love games – and could apply these skills in other areas of creative industry or engineering, but choose not to do so; b) there is considered to be a lack of appropriate skilled people for the videogame industry as a whole, so overall supply is limited.

5. Innovating business models

Many questions over possible business models and pricing are still open. Alvarez et al (2011) suggest this primarily depends on who the customer: is a business or an association, an institution, a citizen, an Internet user, a consumer, a professional, etc.. The pricing model used for a serious game aimed at the general public, whether consumers or citizens, is largely be one of free or freemium and the business model will be based on sponsoring, advertising, subsidies and self-financing and user fees. In most cases, public or private establishment the business model depends on fee-based services that includes the acquisition of a licence and/or a service for training users in the game and/or a game support and update service and/or a service for keeping track of and processing players' results and scores.

The more technologically sophisticated the application, the more difficult it is to play, the more complex it is to configure and the more it requires real-time monitoring, the more the licensing model appears to apply, combined with training and a support service for use of the serious game.

6. Opening markets by shaping procurement and standards

As well as the licensing issues there are many other dimensions to opening new markets. Distributions of products and services in healthcare and education typically depends on large contracts with approved suppliers and formal tendering processes that might be out of the reach of many smaller developers and even publishers, especially in emerging markets. To sell into markets where procurement processes are formalised and centralised, these processes need to be opened up to digital games and digital games suppliers. Processes of quality control and standardisation need put in place, and pathways for procurement of digital game products and services made explicit (which can be an arduous process). Classification of a game as an ICT product that can only be purchased from an approached ICT supplier introduced a gatekeeper that may not be appropriate for the product. Publishers or suppliers that have established links into each sector of use have to be engaged in the process of supplying game-based products. Public procurement can also be used to foster innovation, (Bodewes et al 2011; Nyiri, 2007) and could be looked at as a way of supporting the development of a serious game supply industry in specific public-funded sectors.

7. Structuring serious game production and expertise by target sector.

The question raised at the beginning is whether there is a 'serious games industry' that can be identified and has common challenges, dynamics and identity. One trend against this is the that game development and use will become part of mainstream product and service supply in each of the application domains, so value chains will be structured around developers who are specialized in designing education applications, publishers specialized in healthcare products, etc. Many (but not all) game-based approaches could be considered a type of 'knowledge intensive business service' (KIBS) that requires close cooperation between suppliers and developers developing no just one, but a range of products and services (Den Hertog, 2000; Miles, 2005). The most established and least experimental sector relates to business communications and consumer information segment, whose linear organisation will probably most closely resemble the traditional video game sector. Other sector expertise may be more embedded in user organisations, where local customisation, training and practice is important.

8. Persuading reluctant users

While some large corporations and organizations are really starting to incorporate serious games as a training, information and communication tool, many of them still need to be persuaded of their usefulness. A key challenge is convincing small and medium enterprises (SME), which would help expand the client base for serious game developers considerably.

Several things could help develop potential client and user interest, including significant demonstrations of successful use in model situations: **robust evaluations; recommendations** within business networks especially from large organizations; **support from public authorities,** local and regional government involvement in creating a **serious game-friendly environment** for the sectors that are potential users as part of smart regional specialisation

142 In the UK 60% of workers in Creative Media have a degree or equivalent level 4 qualification compared with 36% of the population of working age across the economy. Skillset (2008) Creative Media Workforce Survey.

and more clear structuring of target sectors into business clusters.

9. Developing for all platforms

Serious games are currently confined mainly to play on computers and, to a lesser degree, mobile phones. However with the rapid uptake of mobile platforms, including tablets, this is likely to change. Games for behaviour change may be more appropriate on personal mobile devices, and tablets suit many situations where a PC is not appropriate. Developers need the tools and skills to produce for old and new generation consoles, smart phones, tablets, connected televisions, integration of social media and incorporation of other electronic devices related to ehealth and wellness.

10. Implementing and exploiting new technologies

One of the reasons for the emergence of 'serious games' is the advanced technologies, including accelerometers, gyroscopes, AI, gesture recognition, and 3D graphics processing now available to the consumer market through specialist games devices, (and many of which now feature on mainstream mobile platforms). What has differentiated serious game developers from firms developing high-cost equipment is the ability to piggy-back applications on these mainstream game systems, such as the Wii and Kinnect, and adopt game making tools to create serious applications, like rehabilitation or military training that is often much cheaper alternatives to expensive specialist equipment (Zynga, 2006).

Nonetheless, serious game research is also pioneering technologies such as facial recognition, combined with voice recognition to achieve emotional feedback. This function opens up a broad field of potential serious applications in the area of inter-personal skills (see for example EC FP7 funded projects TARDIS[143] and ASC-Inclusion[144]). Serious games also need to tap into the emerging social gaming, and online gaming platforms and practices. The value of specialised serious games firms, and firms that cover both serious and entertainment games is that they transfer competence from one domain to the other.

There are challenges to serious games that are not faced by the entertainment sector, which only has to concern itself with making the best of technology available, and wowing audiences with the next generation of AI or graphics. Serious game makers have to address specific needs and requirements of particular uses – be it training surgeons or providing tools for autistic children which may limit approaches based on existing digital game technology. In addition some of the simple types of approaches which work well in entertainment, will not be sufficient: a serious game will often have to reflect reality very precisely, and be much more sensitive and adaptive to players. Serious games have to be much more cautious with sensitive data entertainment service providers (rather than 'just' personal identify data and credit card details). Games that produce and use sensitive evaluation data may have to be interoperable and compatible (in privacy etc) with Information systems in the contexts they are use, schools or primary health care. IDATE interviews suggest that this is one way that the 'serious game industry' may start to differentiate itself from video game industry, but this is also a challenge for developer not used to this type of environment)

3.6.1 Summary

Serious games and gamification is an innovative sector, with growth potential, but still in a formative stage. The industry is establishing itself with new knowledge, successful firms and a growing market among public and private customers. The application of serious games would appear to offer a range of opportunities. Major shifts in state-funded use environments, such as from health to wellness, and towards more personalised education open up these markets to the advantages of serious games.

The whole field of serious games is only just emerging. While the knowledge base and skill-sets are starting to emerge and there is now over 10 years of experimentation, and some successes, there is a long way to go to create a robust practice and industry. There are still fragmented markets, and few connections between the video game industry and areas of non-leisure application. There is little knowledge of digital game-based practices in domains of application, and few bridges between developers and users. It is not clear that activities in different application sectors link to form one industry: it may still be premature to speak of a 'serious games industry'. Long term sustainable business models are not yet established in the sector.

The inclusion of specialist game development firms and professionals in projects allows the exploitation of leisure game technologies and systems in applied markets, but the serious game industry and research has poor links with the mainstream game industry, and only in a few areas such as elearning are firms combining work for leisure and non-leisure market. However few Digital Games companies are starting to operate in both industries. The ability to do this offers opportunity for diversification and strengthening of the interactive media industry with the game industry's specialisation.

Connecting the supply industry to the users is important for industry and knowledge development. However shifts in the structures and practices in the provision of health, social services and education are very slow, and can be disruptive to the growth of business. Attitudes, institutions and practices of application domains need considerable encouragement to develop, from basic research through to standardisation and building communities of practices, and eventually, creation of markets in digital game products and services.

143 http://tardis.lip6.fr/

144 http://www.asc-inclusion.eu/

Table 25: Challenges and actions for the serious game industry (based on Alvarez el al 2012 with author development)	
Challenge	**Example Potential stakeholder actions**
Reshaping the game-play for non-leisure applications	Simplify, using models from casual games design User-centred design with professionals from application domain.
Automating the production processes	Integration and customisation of conventional game design tools Sector specific tools
Building multi-skill teams and organisations	Build multi-disciplinary teams Develop expertise in managing serious game teams and projects Repurposing competences and assets for serious game work
Training and educating people to work in serious games and gamification	Train games development professionals for serious game development Train application domain specialists to work with game developers Stronger links between on-house training and tertiary education
Innovating business models	Develop specific business models appropriate for each sector and target users
Shaping Procurement	Address issues within procurement processes to make serious game adoption easier, thus creating attractive markets.
Structuring serious games industry by target sector	Support evolution towards organisation of firms and expertise that meets the needs of users.
Persuading reluctant clients and users	Provide convincing evidence and demonstrations Convince SMEs to invest in use of DGs Invest in R&D Build structured local business environments as part of smart specialisation policy
Investing in all platforms	Do not limit development to the PC and browser platforms, but build serious games for platforms such as mobile phones, tablets, TV and specialised ehealth systems
Implementing and Exploiting New technologies	Exploit novel technologies being made available on latest gaming platforms Develop and implement new technologies for specific user needs that are not available on game platforms

3.7 Innovation and production of special-purpose games for DGEI

This general overview of the video games and serious games sets the scene for looking more closely at the processes of innovation and supply of digital games for social inclusion and empowerment. This section expresses some of the the general issues in the development of serious games focusing on the case of special-purpose games, and the challenges faced in bringing stakeholders together. This is done from the literature, but also an analysis of through analysis of the original case studies.

This section also introduces normative recommendations about how these types of products can be successfully turned into both **sustainable practices** and **sustainable businesses** and proposes a preliminary value network or ecosystem for digital games for empowerment and inclusion which encompasses stakeholder roles typically found in the games industry, as well as roles specific to this market.

It is clear, though, that the following key challenges present themselves

1. **Sustainability:** Creating a sustainable financial model for an individual digital game, and long term DGEI production

2. **Distribution:** Selecting and creating appropriate distribution channels that actually reach users.

Developers, social and public partners are facing the difficulty of progressing from research to market because they do not have sufficient resources (money, staff, skills ...) to do so. Efforts are being made, however, to share knowledge on how partnerships among stakeholders can be formed to balance the different types of value that they are trying to create, i.e. social impact and financial returns.

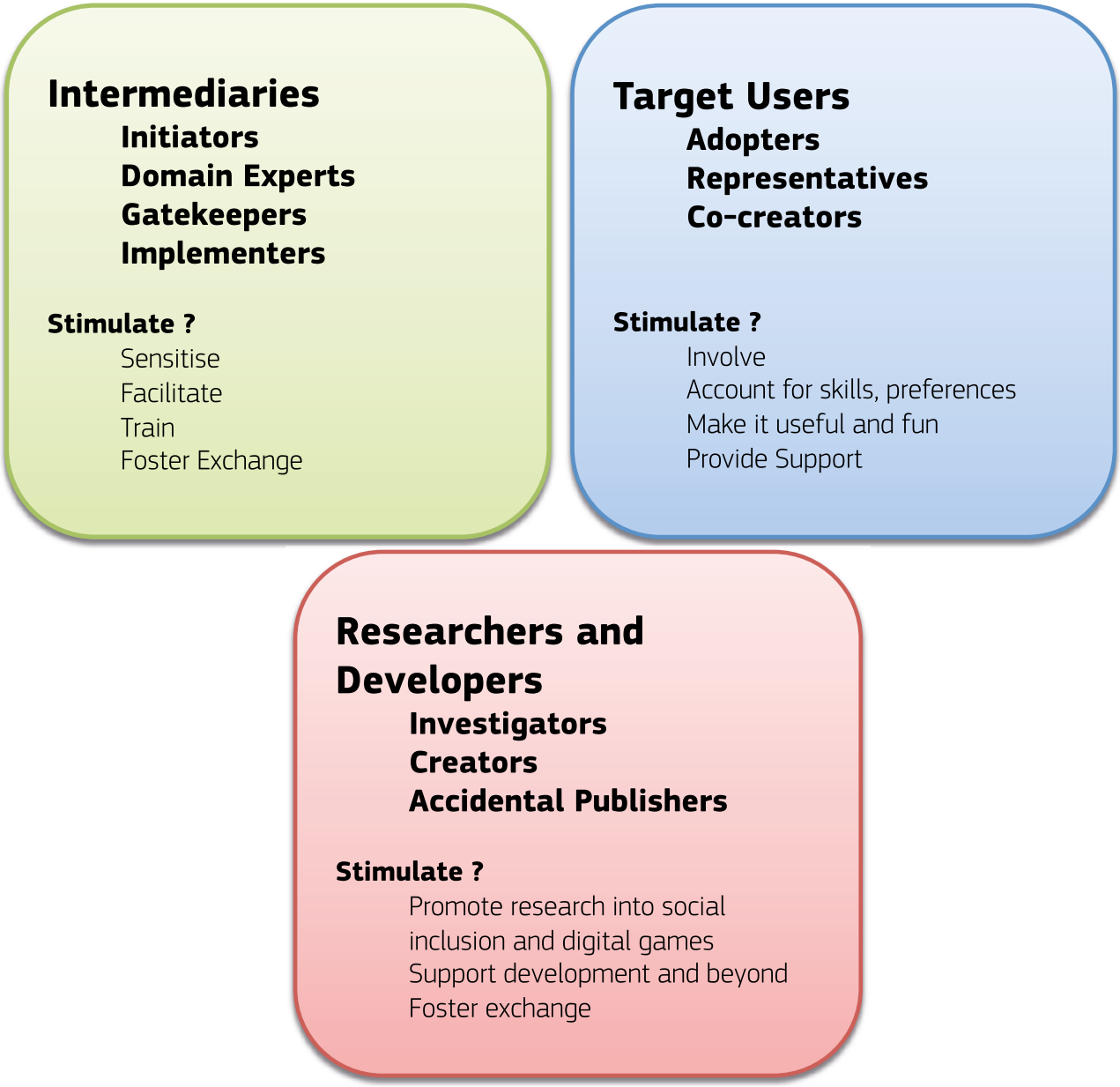
The challenge of successfully making the step from research to market is additionally complicated when dealing with a target users that are at-risk of exclusion, because they are often hidden and hard-to-reach. Ideally, they are reached

via gatekeeper intermediary organizations that have an established trust relationship with these groups.

3.7.1 Stakeholders in the DGEI ecosystem: a project focus

Within a single DGEI project, several actors work together, often taking on multiple roles at the same time and conducting activities in parallel. Here, we highlight the main DGEI stakeholders and we consider what we have learned about the roles they play and how that role can be facilitated (Figure 13).

Figure 13: Highlighting key stakeholders in the DGEI ecosystem.



3.7.2 Inclusion intermediary organizations and practitioners

Intermediary organizations and practitioners that support social inclusion are diverse, including more and less institutionalized actors. Examples of organizations range from unemployment offices, social housing offices and formal education institutions to neighbourhood and community centres, poverty organizations and telecentres. Within these organizations, professionals – such as youth and health workers, social assistants, and teachers – come into contact with or actively work with people at risk. Three groups of intermediaries can be identified:

1. **Formal gatekeepers:** Organizations that work with socially excluded people seeking to control, supervise and rehabilitate them. The relationship between at-risk populations and these gatekeepers tends to be problematic, hence reaching at-risk groups via these gatekeepers will likely be unsuccessful.

2. **Comprehensive gatekeepers:** Organizations that have a long-standing relationship with at-risk populations thanks to their ability to mediate access to services that address day-to-day needs. At-risk groups may be reached through the services these gatekeepers offer.

3. **Informal gatekeepers:** Organizations or individuals that are not institutionalised and use their own resources to address the needs of the at-risk individuals that they have a strong trust relationship with. They may present a path to encouraging in-home use. However, strong negotiation may be required to gain their trust.

These individuals and organisations can take on a number of roles in a DGEI project. As **initiators,** they can be part of the foundation of a DGEI project, starting out from their own experience and searching for funding and partners to address a specific issue. As **domain experts,** they can be consulted at the start of and throughout a DGEI project. As **gatekeepers,** they may have the power to help other stakeholders reach at-risk groups. This is particularly true for those organizations that provide everyday services to those at risk and have built up a trust relationship with these groups through their services. Finally, as **implementers** they can shape a DGEI project by actively contributing to its operationalisation: introducing, enabling and guiding DGEI usage.

From this perspective, intermediary organizations and stakeholders may be stimulated to develop games-based practice in several ways. First, by **sensitizing** them regarding the potential of digital games for social inclusion and empowerment they may become more inclined to start up or be involved in DGEI initiatives. In addition, facilitating implementation would also be useful. This could involve issuing documentation on how to use digital games in the professional context of intermediaries, but also considering how their professional context can be changed to accommodate such use. Practitioners could also be made familiar with digital games and DGEI applications as part of their **professional development.** Finally, **exchange** could be stimulated between those acting in the social inclusion field and those professionally creating games. This means an exchange of expertise, but also of other resources as intermediary organizations often lack the means to invest in the acquisition, let alone the development, of games.

3.7.3 At-risk groups

A second stakeholder group consists of people at risk. As a target audience for e-inclusion initiatives at-risk groups are highly diverse. People can be at risk of social exclusion in one or more areas and their situation can change rapidly over time.

While it may seem most obvious to consider at-risk groups as **adopters** – the target group of end-users whose circumstances one aims to improve through digital game use– this conceptualization of their role ignores the possible contribution that people at risk can make to such an initiative. They can act as **representatives** and voice the needs of their group. Furthermore, they can be actively involved as **initiators** and **design partners** of the initiative, which are empowering activities in themselves.

Having come to this understanding of the roles that at-risk groups can play, how can we facilitate them? As just mentioned, a participatory approach can be applied to **involve** at-risk groups from the start of a project. To then promote adoption of DGEI and the initiatives that make use of them, it is important to take into account the particular target group's **skills and interests** with regard to digital games (e.g. preferred platforms and genres), but also with regard to other areas (e.g. which places they frequent, which they avoid). The digital game that is introduced should **not just be about reaching empowerment goals,** but also, arguably first and foremost, be enjoyable. Finally, it should not be assumed that a digital game will work independently; the way its usage is **supported** and embedded within a wider project is of the utmost importance.

3.7.4 Researchers and developers

Two other important stakeholder groups are researchers and developers. While (Bleumers, 2012) did find examples of game developing companies that are creating digital games for empowerment, it is also clear that many special-purpose games in this field follow the broader serious game sector, and are developed within an **Experimental Research-led** context.

In such an experimental context, researchers can act as developers or cooperate with private game developing companies to **create** a digital game. They can take on the role of **investigators.** As such, their research may inform design of the game based on existing empirical evidence, including input from intermediaries, and theorization on learning and empowerment. Also, they may be involved

in impact assessment. However, despite their insights and enthusiasm, **researchers may not be talented game developers**. Researchers have to recognise this, and develop strong partnerships with people who have the appropriate skills and experience in game development.

Once a prototype is available, however, the developers (together with their partners) may unexpectedly find themselves in the role of **'accidental publishers'** (Gershenfeld, n.d.) struggling to deliver a sustainable product and to identify appropriate distribution channels.

These types of activities can be stimulated by promoting applied research to investigate the impact of game-based inclusion initiatives and fundamental research into social inclusion, digital games and their mutual relationship. In addition, exchange can be supported both in the form of best practices among developers, as well as between developers and social inclusion intermediaries. Finally, support should be extended beyond mere game development to enable the process of **technology and knowledge transfer** to organisations that will conduct marketing, distribution and follow-up support and maintenance so as to avoid that the functioning of certain initiatives which peters out due low capacity of research organisations.

3.7.5 Crucial components for successful innovation

The identification of key components to the successful implementation of DGEI initiatives is still very much a work in progress. However a number of key factors can be generalised from the literature review and original cases.

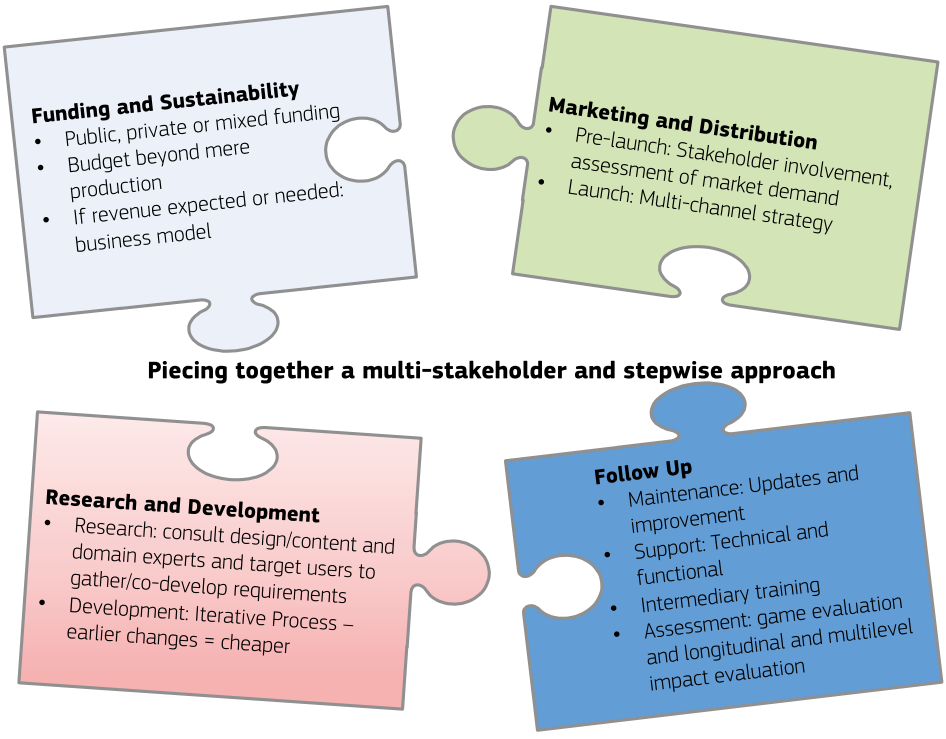
Funding and sustainability

The need for a sound financial plan which takes into account all aspects of researching, creating, marketing and supporting initiatives using DGEI is a formal prerequisite for a successful project that is often given too low a priority. A mixed funding model could be considered where, public funding is used to research and initialize the project and the costs for implementation, maintenance and support are taken up by private partners coupling it with a viable business model.

Research and development

Pre-production is arguably as important as production itself in achieving a successful DGEI project. Background research on the topic at hand but also evaluation of existing games on the same or similar topics should inform decisions on the design path that is followed. Next, successful projects usually respond to concrete needs of end users, but also, and possibly more significantly, of intermediaries. Hence creating a game concept and outline should take place in as close collaboration as possible with a broad variety of stakeholders. This stage in the development process should be given ample time and attention as changes in the design plans are still relatively cheap at that point. For this reason, as in the commercial games industry, it is advisable to make a highly detailed game design document and development plan so as to keep the production time, during which design changes are expensive, as low as possible and thus reduce cost.

Figure 14: Some crucial building blocks for a successful DGEI project



Marketing and distribution

A rule of thumb in the commercial games industry is that marketing a game should be budgeted as high as developing it. Whilst this does not apply to DGEI, it does underline the importance of a well thought-through marketing plan. Creating a high-quality game, even on all of the above described dimensions, does not automatically lead to successful diffusion. Particularly in the case of DGEI, certain population groups can be hard to reach. Therefore, again, **strong partnerships** with stakeholders working with these groups should inform any decisions on how to approach them. Furthermore, single-shot strategies can be risky. Instead it is advisable to aim for a **broad, multi-channel communication strategy** stretching over a certain period of time.

Follow-up

This pertains to a number of activities that require ongoing investment in DGEI (initiatives) well beyond their creation and introduction. It includes **maintenance;** ensuring that quality of the platform and related services is guaranteed and that improvements are made when the needs of the target group evolve. Another activity is **support;** both technical support for the digital game as well as functional support to facilitate usage within the setting of use (e.g. through documentation). Related to this, **training** of those implementing the digital game is likely to enhance its effectiveness and successful diffusion. Finally, **assessment** should be a key part of the DGEI project; this involves evaluation of the usability and playability of the digital game itself as well as longitudinal and multi-level evaluation of the impact of the initiative. The latter will inform stakeholders on the presence of short- and long-term impact.

3.7.6 Summary: call for a multi-stakeholder, integrated approach to innovation

Social exclusion is multi-dimensional and very context specific. Initiatives dealing with such issues should comprise a multi-stakeholder, integrated approach. This holds true when contemplating the use of games; we cannot expect a digital game to resolve such a complex issue in isolation. Furthermore, even when a very particular empowerment goal is targeted (e.g. enhancing particular employability skills), several types of stakeholder roles and expertise are needed for an effective approach.

Intermediary organizations play an important role in several ways. Through the trust relationship they maintain with at-risk groups, they represent gatekeepers that can introduce a game-based initiative to people that might otherwise be very hard to reach. This is particularly true for comprehensive gatekeepers, who offer services relevant to the everyday life of at-risk groups, and informal gatekeepers. Going via formal gatekeepers (e.g. formal learning institutions/ settings) may be less effective for at-risk groups, but still holds a valid path for those who are engaged in formal education. Intermediaries also play an important role in the implementation of game-based initiatives as they can guide and motivate participants throughout the empowerment process from entry to incorporation.

Other important types of expertise and resources include game design expertise, effective publishing methodologies, financial resources, expertise about and from the target group. These require requires partnerships between game developers and intermediaries, seeking out publishers or finding resources on how to create a game that is sustainable and market it effectively, working together with funding organizations or obtaining grants from governmental institutions. Expertise about the target group (in terms of game play, but also their everyday life in general) can be acquired through needs and requirement analysis, but can also be incorporated through participatory approaches.

Partnered stakeholders may find it difficult to assess impact of their initiative. It requires making a joint decision on what is considered as a valuable outcome, who should assess it and how it should be assessed. Given that there are multiple forms that learning can take on, multiple dimensions of social exclusion and inclusion, different types of value that different stakeholders seek to create, agreeing upon outcomes can be a daunting task. Should the focus be on quantity or quality of engagement, on in-game or out-of-game assessment, on knowledge building, skill acquisition, communication, authentic practices, or all of these? Who should do it? Putting the role of assessment in the hands of those that work with at-risk groups may also compromise their relationship with them.

3.8 Relevance of the videogames and serious games industries to DGEI

These previous sections have sought to capture the current state of play of the video game and serious game industry and markets, and the processes and stakeholder involved in developing special -purpose games. The role of the analysis is to assess what the contribution of the video-game industry and serious game industry could be to the use of digital games for social inclusion and empowerment, and how policy makers and other stakeholder should consider engaging with the actors involved in both entertainment and non-entertainment sectors. While not having a determining effect, the form, pace of development and impact of DGEI will be strongly shaped by activities of actors in these fields, and the choice policy makers make in engaging them in pursuance of public policy agendas.

The following discussion addresses the way that particular actors, sets of actors and the entire industry could play a role in developing DGEI, the conditions under which this might occur.

3.8.1 The relationship between the videogames industry and 'serious games and gamification': a question for Europe?

An important question for European policy is the relationship between the serious games industry and the mainstream videogames industry, and whether concern for one should necessary involve consideration of the other. The January 2012 IPTS workshop on DGEI highlighted the poor connections between the 'serious game' industry and the mainstream game industry. In general, the mainstream video game industry and existing professionals are not currently showing interest in 'serious' uses'.[145] The return on investment is seen as too low compared with established entertainment markets for both developers and publishers, and it is often repeated that game developers have few ambitions to work outside of the 'pure' game sector.

However, the video game industry is certainly of relevance to any growth of success in serious game development in Europe. In can be argued that a strong interactive media industry, in particular focused on video games, but also in online media and emerging mobile and social network service sectors is necessary, to ensure dynamism and innovation in Europe in this sector, innovation and economic strength that will spill over to the 'serious game' industry(ies). Entertainment games represent much higher value business than serious games, with the resulting higher rates of investment and innovation.

The current perceived disinterest from entertainment game publishers, developers and other market actors is a result of the current small size of serious game markets, and the differentiation from consumer markets in lead users, such as training (defence or corporate). Supporting diversification t o s erious g ames m ay h elp s ome c ompanies such as smaller developers, but might be a distraction from growth in global leisure markets of the industry as a whole.

The serious game and gamification industry faces a number of challenges, as outlined above. The mainstream video game industry can play a role in meeting some of these, especially: Automating the production processes; Supply and integration of skills designers and technology specialists; Innovating business models; Shaping Procurement; Persuading reluctant users; Investing in all platforms and Implementing and Exploiting new technologies.

The mainstream industry can bring:

1. **Middleware tools** that are crucial for low cost, high quality game production.

2. **Distribution,** especially web and mobile platforms, which boost some of the ways games can reach users.

3. **Developers,** who can use expertise to develop games and services in non-entertainment sector.

4. **Publishers.** Game publishers may provide the branding to reach some markets in serious games (Nintendo, with its role as hardware vendor etc), but are not generally interested in non-consumer sectors. However publishers can play a role in raising awareness (and have an interest), and perhaps through funding research, and providing skills, and making COTS games available more terms suitable for certain application areas.

5. **Production service providers.** These firms will enable serious game production, particularly when developers have less in-house competence, when budgets reach appropriate levels.

6. **Relationships with IP providers.** Europe is strong in this area, and these are likely to be key player producing locally relevant products, and strong global products, particularly in cultural sector, education etc.

7. **Educators.** Universities produce graduates in specialised course to work in the games industry as developers. People must see career options to be attracted to learn the skills, otherwise the programmes will fold. Without these programmes, it is much harder to train the developers of serious games.

8. **Researchers.** Researchers are leading the cross-over between videogame and 'serious' games in many research fields, and there are likely to be common teams and research groups that work on both. Strong links to the mainstream entertainment video game industry would ensure flow of people, ideas and technologies from high value entertainment markets to non-leisure applications.

9. **Innovation** The videogame industry is diverse and dynamic and for the most part innovative in producing new technologies, game genres, and cultural products and memes. Without this dynamism, the serious game industry is in a much weaker position.

10. **Audience and awareness.** While the games industry has in many ways created the negative images of games thorough the directions it has taken in the past, it has also opened up new markets in recent year, bringing new ideas of what games are, how they are played, and who plays them. Attitudes and experiences of games for the majority of the population are unlikely to be driven through 'serious games' (although there will be a part that is). Without the familiarity expectations, skills of potential users of serious games will not be in place.

11. **Leadership.** A strong European videogame industry could provide strong leadership to all game sectors, encouraging people to enter game development, raise the cultural and economic value of the sector and awareness of the contribution of the games to the economy and European culture.

145 Some firms, such as Valvesoftware and some of the middleware tool builders are exploring the education market and support for educators.

3.8.2 Potential contribution of the videogame industry to DGEI

If the mainstream videogame industry is not showing much interest in 'serious games' then, then the same can be said for most DGEI applications. However, building on the previous analysis, we argue that the videogame industry can provide a range of 1) **indirect inputs** to DGEI, and 2) existing and potential **direct inputs** to DGEI. Thus, the future trajectory of the industry and market for entertainment games will have an impact on the future of DGEI.

Indirect inputs

These indirect inputs more or less mirror the factors mentioned above, and include shaping the audience for game products and service, changing the image and awareness of games, development and diffusion of new platforms, devices and delivery systems, supply of games that can be used in DGEI practices, development of new game genres, business models for creation and distribution of games, training game developers, and creating tools for creation of products and services and running on-line environments. These could reduce the costs of production of DGEI products, raising the quality of production, facilitate distribution, and facilitate new and sustainable business models in this market.

As has been discussed in the previous chapter the entertainment products of the videogame industry can be used directly for DGEI uses, without the industry having to consider this at all in their activities. The high quality, cutting edge and up-to-date entertainment games that engage people through narrative, play, visualisation and social interaction are a valuable output of the industry. However there are some problems that have been reported – for example, many entertainment games are dropped from commercial sale very quickly if they are not successful, which is problematic if the game is useful in some DGEI context. A solution suggested is a library of back-titles, but this does not allow for having access to more copies.

Direct inputs

It is not true to say that the videogame industry has entirely ignored areas of the market that fall under DGEI: educational games are a long time feature of the consumer market, primarily targeted at children and their parents, adding 'educational elements' to a fun game. However, there are new features of the future games market that may result in actors from the games industry playing a more direct role in DGEI. These may come from developing consumer markets and business markets; SMEs diversifying into non-leisure markets as a way of exploiting assets and balancing risks and taking advantage of new markets emerging; the support for game development education (e.g. supplying tools, trainers); support for changing the image of games with direct education of decision makers and the public; making products and services more easily available in DGEI markets; and other CSR activities, such as supporting school use of COTS, and training in game development.

Some parts of the games industry, notably market leader Nintendo opened up an important new market in digital games with an explicit 'empowerment' element, and thus brought many new players into the market during the 2000s, with products such as Wii Fit, Wii Sports, and 'Brain Training' appealing not only to people wanting to have fun, but having fun with some supposed additional positive personal benefits, both psychological and physiological. Despite equivocal evidence on the actual effectiveness of these products (Nouchi et al, 2012), the success demonstrates market demand, and a whole slew of profitable entertainment games with positive value, such as dance and music games have followed. The leadership demonstrated by companies like market leaders Nintendo, and to a lesser degree Microsoft, could be shown by other firms such as the major publishers, and could encourage more investment in the sector and production of products that can be used for empowerment.

Competition in the entertainment market is high, with unpredictable commercial success of individual games. Firms from across the video game eco-system, but particularly smaller developers, are starting to look to the emerging markets in advertising, communication, healthcare, and 'gamification' as potential markets for their established skills and platforms, particularly when these existing assets can be used to generate new income for marginal investment. However, skills and techniques for entertainment products need to be integrated with specific application domain knowledge, which would mean professional designers and business must be encouraged to work outside their traditional areas of interest, develop new techniques and knowledge, and learn to work in teams with professionals in the application domain.

Finally, the issue of the image of videogame is an area video game industry can be engaged directly and indirectly. The widespread negative attitudes towards the value of games,[146] as an isolatory and 'anti-social' activity is of course contradicted by the same widespread purchase and use, and recognition that 'face to face' video game playing at least can be a deeply social activity that bring friends and family together (e.g. McGonigal, 2011). The negative image partly comes from the fact that some of the industry has pursued a 'hardcore' market of young males, depicting themes popular with this group.. The long-term efforts of the videogame industry to change this image by campaigning have largely failed. However the diversification in audience and high visibility of other game genres and casual gaming is likely to support at least a partial change in image to the public. There is scope for mutual reinforcement of image of videogames and DGEI by generally highlighting the positive value of videogames as cultural products and industry, and

146 Bösche, Kattner (2011) Fear of (Serious) Digital Games and Game-Based Learning?: Causes, Consequences and a Possible Countermeasure, International Journal of Game-Based Learning, 1:3 1-15

with the videogame industry supporting the use of video games in DGEI.

Despite some motivation for firms in the games industry to engage with DGEI directly, firms may require some persuasion to become more involved in DGEI activities, and policy makers and practitioners should seek as a priority to engage the industry at all levels.

3.8.3 Relevance of the serious game industry to DGEI

The serious game and gamification 'industry' including related research is crucial to the success of DGEI for a number of reasons, not least that many of the areas of serious game application are precisely in empowerment and inclusion in all its forms. However the development of digital game-based approaches for empowerment and inclusion should not just be seen as just a sub-sector of a serious games industry or as a number of markets for commercial products and services. The application of digital games depends on developing not only products, education and research, but practice among the intermediaries of social inclusion, in both the public and third sector, which may call on industrial suppliers for products and services. Nonetheless a 'serious games' industry, specialising in the needs of intermediaries and end users is likely to play a very important role in developing this practice. Innovation usually entails constant movement of people and ideas between practice environment and support roles in industry, research or policy, and this is unlikely to be different in relation to game use (Williams et al 2002).

Five main reasons can be found for the serious games industry being relevant to DGEI.

1. A thriving general serious game industry, supplying commercial markets will provide the ecosystem of supply and support needed for DGEI, with operating teams or networks of developers with tools, development and distribution platforms, services such as training, customisation and localisation, and research and development of techniques and design methodologies, and knowledge of good practice in producing effective interventions that produce impact effectively. A serous game industry will include publishers who may invest in open new markets in supplying services to particular DGEI markets.

2. Serious games and gamification research in academia and enterprise can support the development of a scientific approach to application of games, to complement the arts and entertainment approach of the videogame industry. This can include specific knowledge related to learning, wellness etc, but also the transfer of knowledge in more communication and marketing areas where serious games are being developed.

3. The serious game sector can support the adaptation of games technologies to applied sectors – mastering the new interfaces and game engines, and repurposing them for specific problems identified in application areas.

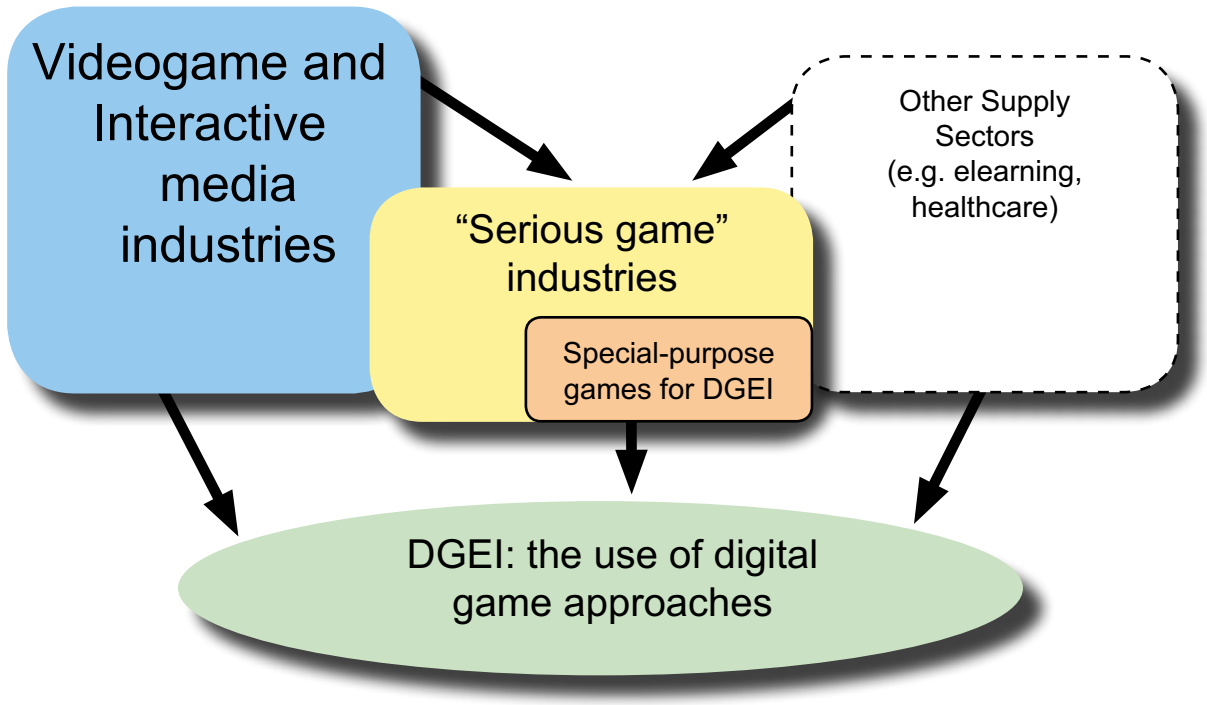
4. DGEI requires game development professionals and managers who know how to create serious game products: a broader serious game market will sustain these teams and build the experience they will need to work on DGEI type projects. Game education can prepare students in many disciplines to use game techniques in their own fields, as well as preparing specialists in game design to work in non-entertainment fields.

5. Finally, without a 'mainstream' serious game and gamification industry that is sustainable and delivering high quality effective products to commercial sectors, it is unlikely that the use of digital games for inclusion and empower is really going to have a change of developing – failure in these markets would indicate that the products and services were actually not that effective or economic to develop. This issue is of considerable importance to the overall shaping of policy in this domain. The following section considers some of the issues.

3.8.4 Summary

The previous sections have argued that the development and use of DGEI is influenced strongly by the supply of knowledge, products, skills and services from both the emerging 'serious game' industries, and from the diverse videogame industry. What is more, these two sets of actors are not independent: the future of the serious game industry depends in many ways on the future shape of the videogame industry (Figure 15).This has implications for policy actions in support of DGEI, and indicates the important of joining up policy and policy making processes related to the videogame industry, serious game industries and DGEI use.

Figure 15: Relationship between videogame, serious industries and DGEI use



3.9 Policy activities shaping video games and serious games

A final set of evidence that is important to bring together the full picture, relates to the policy actions that have shaped video games and the emergence of the serious games industry. This support has been largely through funding for research, but also through purchase, regulation and industry support. Five main areas of policy action can be identified, with particular reference to activities of the European Commission (Table 25).

Table 26: Policy support for video games and serious games

Support area	Types of actions
Support to the video games industry	Support to industry in the form of tax credits Programmes of education and training of professions to work in digital games production. Regional and National policies to provide multi-dimensional structural support to the video game industry.
Research and development	Funding of basic and applied research on digital games and all related technologies. Funding for research on digital game culture
Support for serious and applied games industry and use	Funding of development and innovation of digital games in a range of applied sectors including social inclusion. Funding and supporting use of digital games in education. Funding of 'serious games' and simulations especially for and by the military. Public procurement of games to stimulate innovation and industry
Regulation	Regulation of content Regulation of consumer markets
Leadership	Championing the digital games industry Leading the development and use of digital games approaches in applied domains.

3.9.1 Support to the video games industry

National programmes of support for the commercial industry, particularly tax relief, have led to controversy and divisions within the industry. In Europe, the French government has been building a series of support actions for the game industry since 2003, with the Ecole Nationale du Jeu et des Médias Interactifs Numériques (ENJMIN), a preproduction fund (Fonds d'Aide au Jeu vidéo (FAJV)) and the Research and Innovation Network in Audiovisual and Multimedia (RIAM). In 2008 France proposed a tax credit system of 20% on development costs of a video game with 'cultural content', on the basis of supporting the games industry as part of the cultural industry (Kerr 2009). This was justified largely as a move to keep a game development industry in France, since the principal French publisher Ubisoft was shifting production to Canada. Canadian provinces, notably Quebec, had initiated systematic and more aggressive policies to build the game industry and attract inward investment in a number of provinces (Dyer-Witheford and Sharman 2005; Secor, 2011).[147] However this French proposal was considered a protectionist measure by parts of the games industry, global publishers that defended themselves as part of the software industry, rather than cultural industry, under which the credit would be illegal.[148] Nevertheless it was supported by the European Games Developer Federation (EGDF) which see European developers (as opposed to international publishers) threatened by competitors in other countries that receive greater levels of policy support. The European Commission ruled in favour of the French measure in 2007, and it was introduced in 2008, and subsequently extended to 2017 in 2012 (see box on French policy action). This is estimated to be worth 45 million Euros/year. The measures of Canada and France have been widely blamed for the shift in production of video games from the UK, which had been the major centre of European game development, to France and Canada. After successfully campaigning in the UK, TIGA, a UK game industry trade body obtained a similar UK concession[149] in 2011 as a Small Firms R&D Tax Credit, worth an estimated 7 million euros/year to the industry, and continues to negotiate support.[150]

147 See for example THE FACTS: Canada's fearsome growth, and power, Rob Crossley, 27th January 2011, 'develop'. http://www.develop-online.net/news/36870/THE-FACTS-Canadas-fearsome-growth-and-power which suggests that the 600% growth in the Quebec industry is due to employee tax breaks, and education programmes, with operating costs 24% lower than Europe, and 20% lower than the US.

148 For example the Association for UK Interactive Entertainment (UKIE).

149 http://www.tiga.org/policy-and-public-affairs

150 For a more critical discussion of the debates over industry support see Kerr, A. (Forthcoming).

However these high profile interventions should not distract from the range of regional, national or supra-national level programmes that there are in Europe in favour of the digital games industry (e.g. Sweden,[151] Scotland (House of Commons Scottish Affairs Committee, 2011), Finland[152]). This mirrors not only the Canadian support, where businesses are assisted with a business skills training program, market intelligence, marketing and promotional support, an investor network, an emerging technology fund, and up to 90% tax credit on development expenses (Lyman, 2009), but also structural support developed in China, Singapore, Korea and elsewhere (Kerr and Crawley 2011). As an example, The Skene – Games Refueled programme in Finland, run by TEKES, the Finnish Funding Agency for Technology and Innovation has been in place since 2000 providing several million euros/year for entertainment games, gamification projects, non-entertainment products and tool and technology development. This programme funds development of new operational and business models; cross media concepts and formats, digital distribution models and game research; national and international networking, events and training; research and analysis; and visibility and promotion in international arena. In the UK, the national innovation agency, NESTA has a series of small support actions for games industry as part of the creative economy programme, including to support business skills development in the sector, NESTA, the innovation agency in the UK, organised a pilot mentoring programme for game developers (NESTA 2010), and a project to help developers publish direct to market.[153]

National governments also provide funding for tertiary level education for the games industry in a range of games development disciplines, providing a supply of trained graduates, and a focus for research activities. However, even in the UK, the European leader in game development, the quality of these courses is considered inadequate by the industry (Livingstone and Hope, 2011).

At a European level, the games and audiovisual industries have also been supported through the EU MEDIA 2007 programme. However digital games are the poor relations of 'real' works, and meant to complement an audiovisual work. Provisions in 2011 programme, are "aimed at independent European companies whose main object and activity is audiovisual production and/or the production of interactive works, games development (or similar)" on Internet; PC; Console; Handheld device; Interactive television", "to encourage greater multiplatform creation and collaboration between the audiovisual sector and developers of games and interactive content. It seeks to promote digital content presenting substantial interactivity, originality, creativity and innovation against existing works with European commercial potential. It focuses on supporting those interactive works that are specifically developed to complement an audiovisual work (animation, creative documentary or a drama). The audiovisual works in question are the same as those that are targeted for Single Project and State Funding support. The maximum grant available under development support for Interactive Works is 150,000€. (Guidelines Call for Proposals 22/2011).[154] For future programmes however it is expected that the MEDIA programme will provide funding for interactive works as stand alone works in their own right.

151 http://www.swedishgamesindustry.com/education.aspx

152 http://www.tekes.fi/programmes/Skene The Skene – Games Refueled programme launched by TEKES, the Finnish Funding Agency for Technology and Innovation has been in place since 2000 providing several million euros/year for entertainment games, gamification projects, non-entertainment products and tool and technology development.

153 The NESTA Games Consortium project http://www.nesta.org.uk/areas_of_work/creative_economy/games_consortium

154 http://ec.europa.eu/culture/media/programme/producer/develop/interactive/index_en.htm

Public support for video games and serious games supply and innovation in France[155]

France has an estimated 35% of the population playing digital games, 52% female, and hosts a considerable game production industry: approximately 250 firms, 75% with over 20 employees, with a total of 5000 development professionals. Two major firms Ubisoft, and Vivendi (US owned) are based in France, as are some of the leading Facebook game operators such as Kobojo, Is Cool Entertainment, Pretty Simple, zSlide, Addictiz.

In 2003 the Prime Minister initiated a serious of moves to support digital games as important cultural production: the Ecole Nationale du Jeu et des Médias Interactifs Numériques (ENJMIN), and entrusted the Centre national du Cinéma with the support of pre-production in video game industry via the Fonds d'Aide au Jeu vidéo (FAJV) and other activities. Over 200 projects, to the value of €23.6 million have been since this time. The Research and Innovation Network in Audiovisual and Multimedia (RIAM) has also supported research projects in the order of €8 million.

In 2008 a new measure was introduced to introduce a tax credit to assist the video games industry was proposed in a similar mode to those existing for audiovisual and cinema industry. As a subsidy to industry it was accepted by the European Commission under a "cultural exception" rule which allows for support of European culture and European creativity. Between 2008 and 2011, €40 million per year was granted, to projects of a range of budgets, on average €3.5 million. The tax measure was renewed in 2012, particularly under pressure from the French industry including Ubisoft who threatened to move to Quebec where much more generous support is available.

In 2009, another initiative was introduced by the Minister for digital economy, this time to support the development of 'Serious Games', this time connected to the Industry ministry rather than the culture ministry. The aim was to kick start an industry and the use of games, though demonstration of the potential. A call for projects with a budget of 20 million euros received 158 applications, of which 48 were funded. They cover a range of topics, including health, citizenship, support of aging and social inclusion. This investment has produced considerable activity, but so far no clear impact in technology or use. However, it has stimulated regional investment in serious games. Nord-Pas de Calais has created a pole of excellence for industrial development in which serious games and video games are a key part. Rhône-Alpes, continues to build on the Infogramme investment of the 80s and 90s, which now includes serious games. In Angoulême, Marseille, Bordeaux, Nantes there are associations of video game developers, with a view of cross-media bring a growth industry in the next 10 years.

This type of activity, both national and regional, private and public, can be supported at a European level too, to facilitate exchange, particular in relation to education.

At a European level, systematic support for the games industry as a part of an overall strategy to develop the European Software industry or media industry has not been a significant part of explicit policy, though this has been recognised within parts of the Commission. There is certainly potential in terms of supporting skills development, including identification of skills gaps and needs.[156] Other types of actions might include action to support research, facilitate technology transfer, the development of middleware, industry standards, international export support and access to capital as part of programmes on ICT for competitiveness and industry.

3.9.2 Research and development

National governments in many countries fund research in the field of games technologies, technologies and culture. For European examples, this includes direct funding and grants to specialised centres for research on video games (e.g. Center for Computer Games Research,[157] ITU,DK; Center for the Study of Digital Games and Play (GAP),[158] Utrecht University, NL; Game Research Lab, University of Tampere,[159] FI) and on serious games specifically (such as the TU-Delft for Serious Gaming,[160] NL; The Serious Games Institute,[161] UK), funding of research programmes and networks (Nordic

155 Contributed by Jean Menu, Président de l'association Serious Game Lab jean.menu2008@gmail.com Jean Menu is President of the Association Serious Game Lab and was previously director of multimedia at the Centre national du Cinéma (CNC) and long term advocate of the video game industry..

156 http://ec.europa.eu/enterprise/sectors/ict/e-skills/index_en.htm

157 http://game.itu.dk/

158 http://www.gamesandplay.org/

159 http://gamelab.uta.fi/

160 http://cps.tbm.tudelft.nl/

161 http://www.seriousgamesinstitute.co.uk/

Games Research Network[162]) and indirect funding of networks such as the Digital Games Research Association (DiGRA).[163]

The European Commission has funded a range of projects in the field of Digital Games research, development and deployment, though without clear policy direction. The European Commission has funded over 75 projects directly on games since the early 2000s, primarily through the Life Long Learning Programme and ICT Framework programmes (see Annex). Most of the digital games projects are related to 'serious uses' of digital games, primarily in education and training, but a range of generic technology development has also been supported (e.g. network technologies).

3.9.3 Support for special-purpose game use, development and production

In addition to the research programmes mentioned above, national governments are starting to explore funding of research, development and innovation specifically on the field of serious games. The French serious game programme of 2008 stands out as the principal major European investment, but not the only one, as the TEKES from Finland shows. Globally, investments have been made by the Singaporean, and Korean governments. In Singapore in 2009, the Media Development Authority (MDA) initiated the $6 million Media-in-Learning initiative,[164] to build industry capacity and exploit the benefits of game in learning. This has already attracted foreign business and research to the country. The South Korean Ministry of Culture, Sports, Tourism announced a US$63.52 million investment in 2009[165] to encourage private investment. As mentioned above, the European Commission has been particularly active in the area of serious games, particular related to deployment in education and training, but not focused on support to industry.

It is not clear if public procurement of games has been used as a pre-competitive tool to encourage innovation and the industry (Bodewes et al, 2009; Nyiri, 2007); however public procurement rules, such as the US Small business act have de facto lead to many serious game projects (particularly military) being given to small business, thus stimulating the sector (Alvarez & Michaud 2008). This de facto impact of procurement is also a source of government funds in the industry elsewhere (See Box on DGEI funding in Germany).

162 http://www.ngrn.dk/

163 http://www.digra.org/ Digra is an international professional society dedicated to advance the study of digital games, and to foster the development of research practices and standards in the field.

164 http://www.smf.sg/Newsletter/29/Documents/pdf/MF_issue29_story2.pdf

165 http://www.koreaittimes.com/story/1403/government-likes-serious-games

State of play on digital games for empowerment and inclusion in Germany: Overview of the policy context.[166]

Policy interventions exist to support the use of games to promote social inclusion across Germany, from basic literacy education of adults to changing the attitude of young people to migrants.

Germany has high levels of leisure game playing (approximately 1/3 of the population), and an estimated 10 000 people employed in the digital game industry.[167] However, in general the awareness and use of digital games for non-entertainment purposes is in its very infancy. However there are currently a few good practice examples related to the use of digital games for empowerment and inclusion. The areas identified as related to empowerment and inclusion with existing examples on the use of digital games are:

- fighting functional illiteracy
- fighting discrimination, xenophobia and right-wind extremism
- raising awareness about the internet safety
- promoting democracy and political participation

Specific game-based projects include "The Skillz",[168] to foster intercultural competence and multiethnic team work; **The project "Alphabit" and the digital game "Winterfest®"**[169], digital educational games for German-speaking adults who cannot read and write, and **"Creative Gaming"** [170]**,** which target educationally and socially challenged young people. These have been funded by the Federal Ministry of Education and Research (BMBF)[171], the key public stakeholder contributing to shaping of the landscape of digital games for empowerment and inclusion, especially in relation to digital-game-based learning, the German Federal Ministry of Labour and Social Affairs (BMAS)[172], the Federal Ministry of Family Affairs, Senior Citizens, Women and Youth (BMFSFJ)[173] and the Federal Centre for Civic Education (BPB).[174]

Despite this public commissioning of special-purpose games, digital games are not explicitly addressed by the funding priorities in Germany, so there may be not sufficient incentive for submitting project proposals focusing on digital games. At the same time, while there are only a few good practice projects, most of them not sufficiently documented or evaluated, this situation makes it hard for public bodies to make decisions about funding projects related to digital games, given missing evidence of their effectiveness for empowerment and inclusion. In order to break this vicious circle and create conditions for innovative practice, Dr Buchem recommends explicitly support projects in this area, at the same time defining clear requirements for scientific evaluation in order to generate reliable results, which can serve as a basis for a discussion about the usefulness of digital games for empowerment and inclusion. For the time being, there seems to be a lack of explicit efforts addressing digital games as vehicles for empowerment and inclusion. A coherent and at the same time diversified funding policy related to the promotion of projects aiming at developing and using digital games for empowerment and inclusion seems to be one the key challenges today in policy context in Germany.

166 Contributed by Prof. Dr. Ilona Buchem, Beuth University of Applied Sciences Berlin, Germany buchem@beuth-hochschule.de A longer version is available on the IPTS website.

167 German Trade Association of Interactive Entertainment Software (BIU),

168 "The Skillz" project: http://www.the-skillz.de

169 "Winterfest" digital game: http://www.lernspiel-winterfest.de

170 "Winterfest" digital game: http://www.lernspiel-winterfest.de

171 German Ministry of Education and Research: http://www.bmbf.de/en

172 BMAS: http://www.bmas.de/EN

173 BMFSFJ: http://www.bmfsfj.de/

174 BPB: http://www.bpb.de/

Two key EC-funded policy and practice projects to provide leadership in the field of digital games in education

The European Commission, through the Lifelong Learning Programme, has funded two projects to inform policy and promote the structural adoption of digital-game based techniques in all sectors of education across Europe. The goals are close to those of the DGEI project, and to many of the actions recommended by stakeholders during the DGEI study. **Imagine**[175] was a two-year project whose core aims and objectives were to identify existing and good practice in Game Based Learning (GBL) initiatives and projects across the school, adult and vocational learning sectors and use this to influence policy makers' perceptions and actions to support a marked increase in piloting and mainstreaming of GBL and encourage strategic thinking on curriculum reform. Good practices were identified and a portal of games and platforms provided, as well as networking and knowledge sharing events (Blamire 2010).[176]

Drawing on the EU SchoolNet research (Pivec & Pivec 2008), the IMAGINE State of the Art report (Pivec &Pivec 2009) reviewed all the LLL programme projects with available material (56 of 82) and provides invaluable reference and analysis of the value, outputs and impact of EU funded projects in this domain. One finding was the scarcity of investment in vocational training development of Digital Game use. The IMAGINE project also made a number of recommendations to policy, which are relevant to the formal settings aspects of DGEI, such as the need for a central repository of games, development of vocational games with outcome focus; evaluation of GBL practices; promotion of network between users, developers and research, support to teachers and building on the practice of teachers, and the inclusion of funding for GBL in education modernisation programmes.

The European Network for Growing Activity in Game-based learning in Education (**ENGAGE**)[177] project was a follow up to IMAGINE, and aimed to support practitioners in adopting digital game based learning techniques. ENGAGE attempted to increase the impact of existing work on DGBL by (i) proving that GBL is a method applicable for all five sectors of education, (ii) supporting adaptation of GBL regarding local and cultural issues, including the European Games-Based Learning Portal (iii) conducting valorisation activities to cover directly 12 EC countries and to initiate further dissemination and uptake of tools and methods in the rest of the countries. The Engage project has now finished, but the portal continues to try and meant the project objectives, particularly the "Ideas Market". Another LLL-funded follow-up project, "**Serious Game Design Summer School**" (2012 - 2014) focuses on developing skills among young developers.

175 http://imaginegames.mdrprojects.com/)

176 http://www.engagelearning.eu/wp-content/uploads/2010/11/IMAGINE-Conclusions-and-recommendations-2010.pdf

177 http://www.engagelearning.eu/

3.9.4 Regulation

The most controversial issue related to video games is the question of protection of minors, and the regulation of content. This debate plays closely to the debate over the effects of violence in video games, and to a lesser extent sexual content, criminality and other controversial behaviours (Buckingham et al, 2007; Byron 2008; Bösche and Kattner, 2011). More recently, with the development of online gaming, internet addiction has become part of the debate (Young 2007). Digital Gaming is also confused with problematic 'Gaming and Gambling' involving betting. It is within this context that positive impacts and benefits of video games have been largely debated. In many countries there have been processes of political debate, and formal policy processes to decide on regulation. Some countries have mandatory rating systems, run by media regulators.[178] In most of Europe a voluntary rating system, the Pan European Game Information (PEGI)[179] of 5 age categories and 8 content descriptions was developed by the Interactive Software Federation of Europe (ISFE) has been used by the industry since 2003.

An area where the Commission has competence related to digital games is in consumer protection and the Single market. Part 4.4 of the European Consumer Agenda,[180] addresses ways to improve the protection of consumers using digital content (Guidelines on information obligations of traders/content providers; Guidelines on the Unfair Commercial Practices Directive,[181] DG JUST).

3.9.5 Leadership

Leadership at a political level has generally not been a feature of the digital games industry, or for serious games, with often negative messages and images related to digital games, despite a number of national programmes for industry. However in the US has recently (2011) appointed a senior policy analyst in the White House Office of Science and Technology Policy, Constance Steinkuehler Squire,[182] to advise on policy related to games and learning/impact, and promote sharing of shares serious game knowledge, resources and assets across 33 Federal agencies and four White House offices through the Federal Game Guild (2011).[183] High profile initiatives like the President's Council on Fitness, Sports and Nutrition[184] promote digital games for health lifestyles, and the Obama's 'Educate to Innovate'[185] campaign promotes interactive games as a way to improve education outcomes.

3.9.6 Is there a future role for policy in relation to game industries and DGEI?

Future policy to support the games and serious games industry will be grounded in existing actions and debates, but the growth in serious game markets, the changes to the videogame markets, a focus on the creative and cultural industries as a source of groups, policy programmes supporting serious games and video game industries in the third countries, and the emerging potential of DGEI opens up a number of policy opportunities.

Based on the evidence from this report, and findings of the DGEI State of Play report, rationales for potential policy intervention are identified as falling into three broad categories: Growth and Jobs, Inclusion and Culture, and Public Service effectiveness: The potential policy actions to pursue these opportunities are developed in Section 4.3 The Potential for Policy Action.

178 For a US industry perspective see the ESA http://www.theesa.com/policy/scotus.asp

179 http://www.pegi.info/

180 http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2012:0225:FIN:EN:PDF

181 http://ec.europa.eu/justice/consumer-marketing/files/ucp_guidance_en.pdf

182 http://website.education.wisc.edu/steinkuehler/blog/

183 http://www.howto.gov/training/classes/gamification

184 http://www.fitness.gov/

185 http://www.whitehouse.gov/issues/education/educate-innovate

4. Meeting Challenges, Exploiting Opportunities

4.1 Introduction

The evidence presented so far suggests that there are considerable opportunities to exploit the potential of digital games in fields where policy supports social inclusion and empowerment action. Despite strong research evidence, empirical examples and growing markets in some areas of applied or serious games, this is clearly a nascent area at a largely experimental stage. There remains much to achieve to move from local applications and small businesses to more systematic exploitation of the opportunities available, involving creation of new technologies, content, products, business, use practices, institutional support and quality control. The question is therefore, how might this change be achieved? And for the stakeholders involved, how to generate, successful and sustainable innovation? It is clear that products and practices are not available ready-made that can be rolled out to a waiting market, or even a market where producers and users can meet and purchase products and services. The current dynamics of innovation are therefore primarily focused on creating a stronger ecosystem(s) for DGEI, building **sustainable practices** and **institutions of supply and use, building relationships** between potential users and suppliers, and creating the **distributed skill and knowledge base** and **the institutional support** and affordance to allow digital game-based practices to take root.

Chapter 2 identified a number of opportunities for DGEI:

1. There **is considerable and diverse use** of Digital Games-based approaches in a wide range of contexts. The majority of work focuses on young people, but many other groups are also targeted ranging from children from deprived communities, NEETs, disabled people, the acutely and chronically ill both mentally and physically, elderly people suffering isolation, young people in communities with high crime rates, and issues of extremism and racism, and entrepreneurs in developing countries.

2. **Outcomes are varied and numerous,** focusing on building self-confidence, social participation, basic and specific skills and knowledge, wellness and creative thinking and entrepreneurship – digital game based approaches can be **effective** in addressing empowerment and inclusion

3. Game-based approaches are not based on the design of a game that is used in isolation by an individual; they are usually developed and deployed to **support inclusion intermediaries** from specialized and mainstream institutions in their work. Games are often deployed in group work, in order to stimulate social interaction and to strengthen participation and the social scaffolding needed for successful empowerment..

4. Games-based approaches are **relevant to all age groups,** but there is a particular opportunity today to **reach young people at risk** who already have a high engagement with digital games and play.

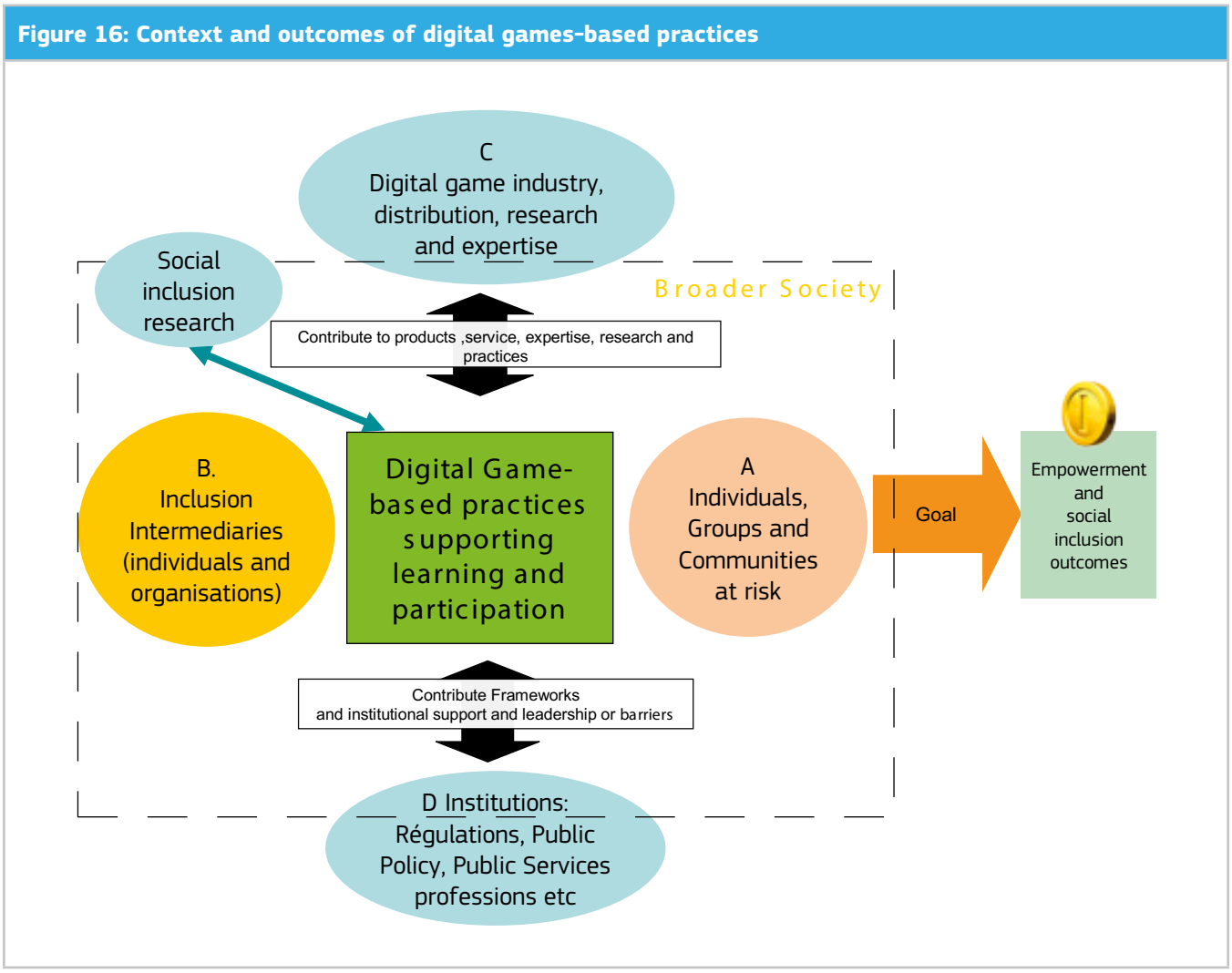
5. There is tentative evidence to suggest that digital game approaches could be effective in improving empowerment and social inclusion services, and this evidence demonstrates there are **many pathways to scale, replicate or disseminate use of games** and game based practices, from centralised push to self organising communities of enthusiastic users. Individual packaged products and services – special purpose games - with appropriate support material and online communities can be rolled out to hundreds or thousands of intermediaries. In the case of game-based practice requiring more expertise on the part of inclusion intermediaries, online networks and institutional initiatives that provide demonstrators, support and some resources can be effective not only at knowledge transfer, but at developing mainstream practice.

Despite many positive activities, the review of literature and empirical evidence also found that there is low awareness and considerable scepticism: the form and potential of digital game-based approaches is not understood – even in areas of relatively mature knowledge and take-up, such as school education, and adoption levels are low. Practical and institutional support not widely available, and decision makers are slow to provide it. The quality of outcome evidence

is rather weak, both in terms of the actual outcomes achieve compared with the potential identified in research, and in terms of the quality of studies. It also showed that putting together a project to develop a game based approach is challenging, based on the range of actors that need to be involved and the difficulty of funding, and that achieving long term sustainability is difficult.

Using the insights and evidence from Chapter 3, we can summarise now the entire ecosystem of actors and stakeholders involved in the development and use of digital games for empowerment and inclusion (Figure 16). The core digital game approaches depend on front line inclusion actors or intermediaries (B) successfully developing and using Digital Game-based practices supporting learning and participation together with those at risk of exclusion (C). In this they are supported by social inclusion research. In order to develop game-based practices, intermediaries need to develop creative relationships with the producers and suppliers of games, including the game research community (A), and shaping the institutional support they receive to adopt game-based approaches (D).

Figure 16: Context and outcomes of digital games-based practices

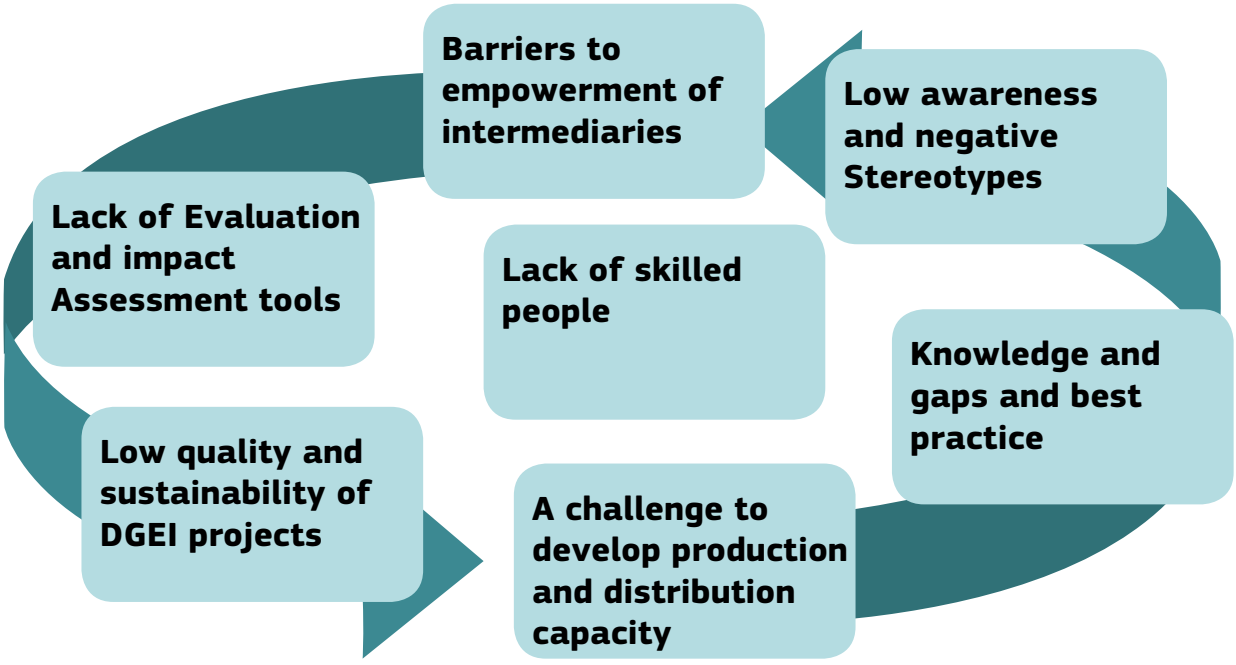


The cases and literature review illustrate that the ideas and practices of digital games use are being developed by end users themselves, by inclusion intermediaries, by digital game research and industry, and from within institutions, including public policy. Chapter 2 and Chapter 3 it was argued that success comes from creative partnerships between intermediaries, developers, and researchers, using participative development techniques with users, that will eventually lead to co-production of empowerment practices. This can be constrained by institutional barriers, but when policy provides leadership and acts to overcome these barriers then localised practice can lead to systemic innovation, as pathways are developed that allow wide spread adoption and appropriation of game-based practices.

4.2 Challenges and solutions to successful innovation and use of DGEI

It is now possible to identify the following challenges to stakeholders face in trying to exploit Digital games and gaming, and identify ways these may be overcome (Figure 17). The challenges are interlinked, interdependent and with no clear priority as to which could be tackled first.

Figure 17: Challenges in DGEI



4.2.1 Low awareness and negative stereotypes

Digital games unfortunately suffer from a range of negative image for much of the public, many policy makers and professions in fields such as education. There are perceptions that Games makes us unsocial, less human, less empathic, they are a 'waste of time' and that specifically they can cause harm to children. Many politicians still do not understand, and even fear games, and political leaders can easily block the use of games through their opinions and attitudes to "damaging" videogames. Political discourse can be focused on 'time wasting', or on violence.

In public and private sector organisations there are also cultural barriers, especially with middle management who only see problems in use of digital games, and negative issues in including games in programmes and organisational practices: the value of serious games as serious tools is not yet widely recognised, and indeed the evidence of benefits may not be yet be clear. However, when political leaders, such as President Obama, make favourable statements about the positive use of video games, this can stimulate both industry and professionals to invest.

There are practical barriers even to potential users who wish to find out about games, and thus to entrepreneurs attempting to develop a business. For example many companies and organisations, including the European Commission routinely block internet access to any sites that are classified as 'games', be it for the main sites of commercial game publishers and developers, serious games sites, information on game-making tools, the game industry and on using games. This makes it very hard for people in these organisations to find out about and contact suppliers, and reinforces the messages that games are 'bad'.

There is clear potential to:

1. Include more positive images and statements about potential of digital games in high level political discourse.

2. Develop more robust evidence of impact, practical examples of best practice and targeted awareness-raising in different sectors of use.

3. Demonstrate value and practicality of DGEI: This could include convincing high profile demonstrators and appropriate evidence is required in each sector of application, developed in collaboration with high status intermediaries such as professional organisations. Support for champions for digital games and gaming with high profile visibility in each sector is one approach.

These could be developed at national or European levels, or at local and regional levels where cross-sectorial use and development of digital game practice can be nurtured and sustained with events and networks, for example, as part of a of smart regional specialisation policy.

However it should not be assumed that digital game methods will reach everyone in need, and be relevant to all target groups: digital games are not for everyone. While many people have visual game culture and game-play culture, other people just do not like digital games, at least of the form that many encounter, and 'games' are not inherently motivational to everyone. This applies to leisure and serious games equally. Even for 'gamers', the acceptance of use of digital games for 'serious' purposes should not be taken for granted. These differences are not just individual; there are cultural differences in attitudes to games, and digital games. This is not a fixed cultural bias, and can be developed. However this may take many years change mainstream negative views of Digital Games.

4.2.2 Empowerment of inclusion intermediaries

While there are aspects of DGEI that can be developed in products supplied directly to end users, or though campaigns to change awareness of games, and practice of game playing, a large part of the value of DGEI is realised through professionals and organisations that address social inclusion, developing game-based approaches and incorporating them into professional practice where appropriate, either for individual cases, and at a more systemic level. Challenges to achieving this can be found at the level of individuals, of organisations, and more systemically in policy (such as curriculum design or support to NGOs) and market development. Specifically these include:

- Attitudes: Negative attitude towards ICT in general and games in particular among many inclusion intermediaries;
- Awareness: Low awareness of the potential of games for inclusion and empowerment;
- Training and information: Lack of training opportunities and access to appropriate market information and distribution channels.
- Functioning markets: Institutional, market and economic barriers to procurement of game service, products and skills.
- Institutional or structural support: Lack of support services, resources and support for individual practitioners and for the development of communities of practice.
- Poor support to Innovation and experimentation: Lack of funding and support for long-term radical experimentation in the redevelopment of education processes and didactics around game-based approaches.

Many types of actions can address these issues. Some are cross cutting, such as changing the general image of digital games by championing the positive values, highlighting the value of the industry and producing evidence and demonstrators, particularly of older decision makers. The promotion of more positive images of game playing by the industry can also help. Targeted, domain specific actions, such as programmes and demonstrators to raise awareness of value of DGEI approaches, and how to actually implement them in practice change make use seem more realistic and concrete. Examples such as the Consolarium in Scotland show how it is possible to address a whole country with modest means.

4.2.3 Low quality and/or sustainability of many game-based inclusion and empowerment projects

Criticism has been made of many existing projects that aim to develop and introduce digital game-based approaches, particularly in the development of special-purpose games. For example research-led projects are one-sided and answer research questions, but produce little lasting direct impact, and implementation projects that are meant to produce impact do not last past the initial funded stages. Practice projects can fizzle out if a local champion moves job, or does not receive support for the diffusion of newly developed good practice to colleagues in a systematic way. Products that are underfunded, or developed without the skill of game designers, fail to capture the imagination of users, or actually deliver intended outcomes effectively. Following points made in Section 3.8, developers, sponsors and users need support to address the following issues to ensure the quality of projects and any services or products that emerge from them:

- User Interest and Resources: The interests, requirements and resources of intermediary organizations and target user group are central to the successful development and appropriation of digital game-based approaches, but are not always understood or respected by other stakeholders.

- Multi-stakeholder alignment and the role of innovation intermediaries. It is difficult to balance the expectations and requirements of the multiple stakeholders including game developers, local intermediary organizations and

representatives of target audiences. As with all novel development projects, the role of innovation intermediaries, such as consultants experts and executive producers that can bridge these different worlds, facilitates interactions and social learning processes.
- Balanced assessment plan. From the outset clear it is important to define assessable targets, both qualitative and quantitative, while being open for unanticipated forms of empowerment.
- Project approaches. Digital game approaches far too often are developed in isolation to existing practices, structures, and policies. Project-based approaches that aim to develop digital-game based practice, rather than develop products address this issue.
- Marketing and dissemination. Similarly, game development and research projects seldom address issues of marketing dissemination and long term sustainability. Projects need well-researched and financially supported marketing and dissemination plan adapted to the needs and requirements of intermediaries and target groups and the specific contexts in which the initiatives will operate.
- Sustainability: Too often projects focus on development and testing, and not on the costs and requirements of longer-term sustainability and development. Programmes and projects need to take place within longer term strategies, considering how they will sustain the initiative and approach the market/ and or user community after development and initial testing is over.

Given the different resources, needs and structure of each sector of use, there is likely to be considerable variation on the way projects can be organised and sustainability achieved. While in some cases products are sold to consumer markets, in others there has to be a focus on developing appropriate licensing and support models to corporate customers. In other cases, sustainability is achieved through professional networks with little economic exchange (e.g. some COTS games and game-making approaches).

4.2.4 Weaknesses in the capacity to develop DGEI projects and distribute special-purpose game products

As well challenges facing individual projects, there are challenges facing the development of markets and networks. There is a relatively low level of awareness, expertise and investment in DGEI from the supply side, in particular for the development of effective special-purpose games. However it is important to point out that without demand from users and sponsors who are willing to pay there will be no sustainable supply. Section 3.7 highlighted challenges for the success of individual projects. This section highlights challenges to development of a sector that develops DGEI products, services and approaches.

Stakeholders need to address the following issues:

- Digital game projects often stumble after the initial development phase. More structural support is needed to enable DGEI projects with public interest develop sustainability, and continued use in practice (marketing, support, maintenance etc).
- Game design and development for entertainment is not the same as developing games for DGEI. Tools, skills and accumulated practice need to be developed and made available to those who need it – users, developers and intermediaries such as publishers, project managers etc; Tools need to be localised, and adapted for each domain of use, and local conditions (such as national and regional curricula) to improve workflow.
- Development of products for new and relatively unknown user groups requires the use of participatory design approaches (in which direct and indirect stakeholders are involved in game creation). Training for this needs incorporated in courses for aspiring game developers and designers.
- Products need to be adapted to local markets, but flexible enough to reach European and global markets. DGEI products need to be adapted for local contexts (e.g. language, geographical points of reference, ethnicity), but each local market is small, and developers do not have the means to customise or localise to diverse markets. Means are needed to stimulate and support publisher and/ or developers to customise and market games.
- Exchange of knowledge and best practice necessary for successful development is rare in this domain, and the networks are currently weak, especially on the side of the inclusion intermediaries. Efforts need to be made to promote knowledge sharing including dissemination of research findings to practitioners, sharing examples and best practices (for instance formation of social networks connecting developers, intermediaries, researchers, ...) This needs to be done within sectors and across sectors.
- Developers and users need to exploit the new platforms – smart phones and tablets, social networking platforms, as well as existing and new generation consoles. This requires appropriate tools, testing and skills. Actions could be targeted in supporting developers of special purpose games to work with these platforms, and enabling inclusion intermediaries with ways to adopt and use non-PC platforms.
- While electronic distribution is increasingly the norm, and getting games to users easier, the institutional barriers to distribution remain high. It is hard to sell products direct to users in education and health services, due to complex procurement procedures, standards and the difficulty of demonstrating the value of a product in markets governed by this sort of rules. Action is needed that will allow new suppliers to operate in these systems, and/or to make sure existing suppliers and publishers offer game products to their customers on terms that make the business of production sustainable.
- Each sector of use has different needs and different organisational features (schools, third sector, health services etc), which vary across countries. Organisations, be they businesses or NGOs or research organisations need support to develop relationships and learn how to operate in particular sectors, including market analysis, networking events, etc.

- Costs of up-front development of digital games can be high. There can be mitigated by subsidy policies and financial support systems (e.g. tax shelters) on an equal basis with other media of member states, and the support for new modes of finance.

4.2.5 Lack of impact assessment tools.

The pathways towards empowerment are complex, and progress targeted by a game-based approach may involve measuring personal outcomes that are not easily assessed by conventional means, for example, self-confidence, peer relationships and identity formation. Games may offer a way to help measure and nurture these. However to demonstrate the value of games there is a need to address the absence of standards and tools in:

- Evaluation in informal, formal and/or non-formal learning contexts
- The specific areas in which digital game based techniques support positive outcomes.

These measures and standards are necessary both in everyday use, and in the processes of developing and testing new interventions, or use with different groups of users.

Without the tools it is hard to develop the evidence for impact, to develop best practice, understand how to incorporate DGEI approaches into practice, and make the case for investment in DGEI. Actions are needed from policy and research specialising in impacts in each sector and across sector (since inclusion outcomes can be common for many types of disadvantage) and within sectors education, health etc to develop impact assessment tools, measures and studies.

4.2.6 Knowledge gaps and opportunities for R&D

There are still many gaps in knowledge, and many potential avenues for research and development, as suggested in Section 2.14. Research is needed to develop new ways of using games, improve ways of evaluating their benefits and drawbacks, and to formalise good practice to enable diffusion and uptake of games-based approaches. The following represent some of the challenges to the research community and research policy:

- Improve knowledge of existing game attitudes, experience, and practices among a diversity of populations to be targeted with game-based approaches.
- Knowledge to develop effective games:
  - Conduct research on how game-play can be adapted to specific communities of users, contexts of use and reaching instrumental goals.
  - Conduct research on novel techniques that can be incorporated into games that target the particular requirements of the intermediaries and target populations.
  - Stimulate living lab research in which formal, non-formal and informal learning settings and communities act as field laboratories to collect further evidence regarding the motivational and learning potential of digital games.
- Stimulate research and development of technical tools to facilitate and improve development and use of special purpose digital games, both in general, and for specific uses and markets
- Understand impacts and outcomes
  - Develop methodological approaches that enable the processes and outcomes of game use to be qualified and quantified within multi-stakeholder and multi-layer interventions.
  - Improve knowledge of the actual impacts on social inclusion of the 'empowering' use of digital game based approaches.
- Explore the benefits and risks tied to gamification
- Document existing good practice
  - Document and analyse existing good practice in the design, support and use of digital game-based approaches.
  - Produce more evidence on failed interventions using digital games available to improve the basis of recommendations of good practice.
- Innovation-support knowledge
  - Conduct interpretive studies into the complex ecology of formal and informal contexts in which digital-game based approaches are developed and used to understand, in order to understand better how users and intermediaries and decision makers can be supported to adopt good practice and lead innovation in use.
  - Conduct research on market needs and dynamics, skill requirements, business strategies, and the innovation and environment for development and use of DGEI to support policy decisions makers and investors.

A challenge its to build the multi-disciplinary research teams necessary for much of this work, and to link research to practice, allowing for research in real-life settings, and action research at scale. In order to understand impact and good practice in design and use, many more interventions have to be made, involving a research community that contribute to, and assess the lessons learnt from each new project.

4.2.7 Human capital: lack of skilled of people trained in development and use of digital games.

DGEI research practice and products cannot be developed or applied without people with appropriate skills and experience. Challenges for policy and practice are to attract people to work on DGEI, and provide them with the necessary training.

- The lack of social inclusion professionals skilled developing and uses games in their practice. Potential action: Develop education and training capacity to train professional in organising with responsibility for social inclusion, such as short CPD programmes, online courses ; Develop networks of learning and exchange good practice among individuals in each sector of use.

- The lack of game developers, of all skills, especially game designers who are motivated and skilled in applying their knowledge and techniques to the development appropriate games for (and with) at risk groups and the professions working in social inclusion. Possible Actions: Develop specialised training and incentives for game developers and designers to work in fields of serious games and gamification. This could be included in game design education programmes at tertiary level. Specialised courses for designers and students could be run at national or European level, either a short courses,(for example, following Erasmus project Serious Game Design Summer School,[186] the Summer School Almere (2012),[187] and the Universidad de Zaragoza/SEGAN[188] project summer school in 2012)[189]), or Masters programmes (building on example of the Serious Games and Digital Content MSc at the Serious Game Institute in Coventry, UK[190]). Another approach could be mentoring programmes and placements in game development firms.[191]
- Expertise in game development is largely developed within game development firms, which creates barriers to exploitation outside the business. A possible action would be to encourage professional game designers to apply their expertise to specific problems of social inclusion and empowerment, and improve the quality and breadth of training available to the users and developers of special-purpose games through delivery of short courses.
- As well as lack of skills to develop games for DGEI, the low sustainability of games projects indicates a lack of skills and experience in project management, and in running business that are sustainable in this market. Strategic decision making, business planning development and marketing are different in DGEI markets to other serious game and entertainment game markets, and at present few people bring together the necessary expertise and experience in this field.

Table 27: Areas for action to support successful widespread innovation in DGEI

Challenges	Example Potential Stakeholder Actions
Low awareness and Negative Stereotypes	Inform the general public, decision makers and politicians of the potential benefits of games and break existing stereotypes.
The empowerment of intermediaries	Promote usage of games for the purpose of inclusion and empowerment among intermediary organizations.
Low quality and sustainability of DGEI projects	Support game-based inclusion and empowerment projects which meet certain defined requirements for success to ensure uptake of results and build sustainability.
The weakness in production and distribution	Stimulate development and distribution of digital games for empowerment and inclusion, tackling demand and supply side challenges.
Lack of Impact Assessment tools	Drive the development of innovative measurements of and standards for impact assessment for game-based approaches/projects for inclusion and empowerment.
Knowledge gaps and opportunities for R&D	Support research in areas of technology, use, supply and innovation where there is limited knowledge, and introduce novel technologies to game platforms.
Lack of skills in use and production	Develop the skill base of people trained in both the development and use of digital games.

186 http://researchanddesign.fh-joanneum.at/node/1765

187 http://www.summerschoolalmere.nl/courses/dme

188 http://seriousgamesnet.eu/

189 Designing Serious (Video)Games: From theory to practical applications, 10 al 14 Sept 2012 http://moncayo.unizar.es/cv%5Ccursosdeverano.nsf/CursosPorNum/41

190 http://www.seriousgamesinstitute.co.uk/study.aspx?section=61&item=446

191 NESTA in the UK piloted this approach for mainstream game developers http://www.nesta.org.uk/areas_of_work/creative_economy/past_projects_creative_economy/games_mentoring

4.2.8 Summary: the need for action

While there are many detailed elaborated here, the need action can be summarised by succinctly through the conclusions of the January 2012 IPTS Expert Workshop. The experts – researchers, and practitioners - focused on six issues that need addressed to fulfil the potential of DGEI, with a strong emphasis of process, and support to producers and inclusion intermediaries.

1. The need for convincing evidence of impact to inform and decision makers.

2. The need to build long-term creative partnerships between stakeholders, intermediaries and developers to experiment and bring together multi-disciplinary expertise.

3. The need to improve understanding of the diversity of use and form of use of digital games, and the importance of context and practice based relevance and innovation.

4. The need to engage the games industry and digital games professionals and students with the potential of 'serious gaming' applications.

5. The need to support inclusion intermediaries in understanding value of gaming, and facilitate the conditions in which Digital Games can be appropriately used in Empowerment and inclusion contexts.

6. The need to ensure DGEI is exploiting the leading edge of digital games and emerging technology, and not the trailing edge.

While these actions are the responsibility of all stakeholders, there are some specific roles that policy can play, either because of the role of policy in stimulating research and economic activity, or because public policy governs and funds the areas in which DGEI is and could be exploited.

4.3 Potential for policy action

4.3.1 Relevance of digital games to current policy objectives

Returning to the current policy programme of the Commission, it is possible to identify the contribution of DGEI to headline targets and flagship programmes. Three of the five goals of Europe 2020 address key factors in social exclusion:

- **Employment,** 75% of the 20-64 year-olds to be employed;
- **Education,** Reducing school drop-out rates below 10%, and at least 40% of 30-34–year-olds completing third level education and;
- **Poverty and social inclusion: at least 20 million fewer people in or at risk of poverty and social exclusion**

These are addressed by five of the major flagship policies: Youth on the move, Digital Agenda for Europe, An Agenda for New Skills and Jobs, the European Platform against Poverty and Social Exclusion, and the Innovation Union.

The use of digital games for social inclusion and empowerment introduces new forms of ICTs which can serve as tools for intermediaries, and build pathways to support social inclusion. **The Digital Agenda for Europe (DAE)** addresses social inclusion through **Pillar 6: Enhancing e-skills.** These eInclusion policies fall at the intersection of Information Society policy, and social cohesion and employment policy. Under **Action 66** of the DAE: Member States are to implement digital literacy policies, to support social inclusion of 'digital illiterates' such as older people or people on low incomes, the unemployed, immigrants, and the less educated, and **developing and enhancing digital skills and competences of particular groups at risk of socio-economic exclusion,** including jobless, immigrants, marginalised youngsters, women returning on the job market. This action also aims to support the ICT skills of **intermediaries delivering social services,** 80% of which are delivered locally by public administrations (by social workers, volunteers, home carers). Digital games are ICT products that require digital skills and competences, but they are also alternative pathways to achieving the benefits of digital technology. Games can be more powerful and more accessible than conventional ICTs devices and services. However this has not been widely recognised in policy and practice.

The Digital Agenda also sets out how the European Commission will support Member States in this policy, and support other Flagship policies. These link policy on digital competence directly to mainstream social inclusion and education and training policy, in particular through **Action 57** (Make digital literacy and competences a priority for the European Social Fund) and **Action 59:** (Make digital literacy and skills a priority of the "New skills for new jobs" Flagship). Digital Games offer considerable promise in the field of learning, as important **eLearning tools,** by empowering teachers, personalising learning and assessment and catering for informal and collaborative learning practices and workforce training. The DAE **Action 68** commits Member States to **mainstreaming eLearning in national policies,** and the EU to supporting this with research and studies on the effective use of ICT for learning.

Supporting and developing digital game technologies and applications could have an affect on more than the Digital Agenda - for example, it could affect policies in the areas of **Health and wellbeing, Public services, Inclusion, skills and youth** including **Accessibility, Creativity, Digital social platforms, Smart cities, and New technologies in networks and services**. Not only can policy support the involvement of the existing games industry in their fields of application, but it can also support the development of novel new technological approaches under technology programmes.

Three Flagship policies that fall primarily under the areas of employment, social affairs and inclusion (DG EMPL), are the Agenda for New Skills and Jobs, The European Platform against Poverty and Social Exclusion and Youth on the Move.

The latest actions of **The European Platform against Poverty and Social Exclusion** (EPAPSE) are set out in the 2012 Communication and Employment Pack,[192] the Youth Employment Pack and the Social Investment Pack.[193] The Commission focuses on delivering actions across the policy spectrum. The principal aims of the platform, as this report demonstrates, are all areas where digital games use has relevance:

- Improved access to work, social security, essential services (healthcare, housing, etc.) and education;
- Better use of EU funds to support social inclusion and combat discrimination;
- Social innovation to find smart solutions in post-crisis Europe, especially in terms of more effective and efficient social support;
- New partnerships between the public and the private sector.

Digital games are being developed and applied in the fields of both social inclusion and employment. In social inclusion policy, application of digital games can be relevant to policies for equity (inclusion of disabled youth), social cohesion and improving jobs (improved training), in managing wellness and chronic health conditions as part of long-term care, and as novel tools across a range of social services. Current examples of experimental use of digital games also include tools for the **active inclusion of migrants.** In education school dropouts are causing concern. Here, digital games are used both to prevent dropout, and to encourage reinsertion. As regards employment, digital games used increasingly in recruitment, therefore DGEI are of interest to public employment services. They constitute a tool to facilitate the **transition from education to work** by developing of employability skills, and support young people especially with all levels of education. In addition, there are more specific policies, such as Policy for Aging. These policies promote 'active ageing' allowing **older workers** to remain longer on the labour market. Here, digital games can be used for retraining, or more generally in enabling **active aging.**

The **Agenda for New Skills and Jobs** maps the routes for bringing more people into employment, with measures addressing supply and demand. On the supply side, these measures include "Equipping people with the **right skills** for the jobs of today and tomorrow". Growing use of digital game techniques in **training and lifelong learning** could strengthen actions in this domain. Digital games themselves are also at the forefront of the shaping the skills of tomorrow - not only the skills needed to produce advanced interactive media products digital games – design, technology, project management and marketing for global markets – but also the '21st century' skills developed by playing games that are emerging as crucial to contemporary work world of work and entrepreneurship.

Use of digital games is relevant to **Youth on the Move** which aims to improve the quality and attractiveness of education and training in Europe. Digital games are a key part of youth culture, and platform for interaction, and the evidence shows how important they can be to engaging youth in education, and creating new forms of education. In terms of current activities, the policy area where there is most experimentation and use of digital games is in formal education which makes digital games of direct relevance to the **ET 2020,** in the domains of school, vocational and adult education, and as part of lifelong learning resources. Digital games could support the core aims of this policy, including education for equity and social cohesion, provision of innovative tools for educators, and improve on the success rates of formal education. European Community programmes have already contributed considerably to research and implementation in this area, and further funding would still appear to be justified.

Finally, the **Innovation Union Flagship** addresses job creation and quality through innovation and new industry, public sector and social innovation and e-skills. Among the sectors explicitly targeted as having the potential to create growth and jobs are the **creative and cultural sectors (Com (2012) 537).** The videogames industry represents a leading edge creative sector in this respect. The general field of applied or 'serious' games would seem to offer considerable potential to drive **social innovation,** exploiting the rich variety of e-skills based on digital gaming practice, and improvement of public services. The 'serious games' sector can also be a focus of innovation driving a growing industry, primarily of SMEs, but also with secondary effects of reinforcing industry with effective products for training, planning and communication.

In addition, the **EU regional policy** for job creation, competitiveness, economic growth, improved quality of life and sustainable development within the framework of the Europe 2020 strategy is also closely interconnected with the delivery of social inclusion, especially in light of the current debate on the reform of the EU Social Cohesion policy. This policy is expected to ensure faster convergence through economic and social integration and greater connectivity in the Single Market, focusing on addressing market failures and ensuring that regions make full use of their development potential in the context of European economic integration.

As well as policies focusing on social inclusion, employment, social services etc, there are a number of policy domains that touch on digital games, such as **Competition Law, regulation of the media industry** that currently shape videogame markets, etc where policy may have a role to play

192 COM(2012) 173 final Communication: Towards a job-rich recovery, 18.4.2012 http://ec.europa.eu/social/BlobServlet?docId=7619&langId=en

193 COM(2013) 83 final Towards Social Investment for Growth and Cohesion – including implementing the European Social Fund 2014-2020; COM(2012) 0727 final Moving Youth into Employment.

in facilitating the use of digital games for social inclusion and empowerment in the future.

4.3.2 Basis for policy

The rationale for policy intervention is made up of three broad categories of benefits to:

- **Growth and jobs:** The positive consequences for employment and growth derived from attracting, rewarding and sustaining innovation in the digital gaming field in general, including spill-overs or technology and business innovation to other industries;
- **Inclusion and culture:** The cultural and user aspects of digital games, especially in terms of users' empowerment and social inclusion; and
- **Public service effectiveness:** The contributions from digital gaming to the provision of public services, such as education, health and social welfare.

Empowerment and Inclusion activities are largely funded by the public purse, to address social policy challenges such as unemployment, poverty, chronic illness, poor housing, etc, and also to encourage other activities such as democratic participation. In many domains, but not all, digital games and games use will only be developed and deployed with a degree of public investment and promises of public markets. Policy makers must decide whether the evidence for the use of digital games and gaming in the private sector is compelling, and if the early experiments and demonstrations of digital games use in areas of empowerment and inclusion show sufficient effectiveness and feasibility, to warrant further support. This support would probably first be for awareness raising experimentation and research, and later for the development of systematic use and industrial development.

4.3.3 Analysis of policy options: an innovation perspective

DGEI is without question a field characterised by innovation in many different types of public and private organisations, and with a heterogeneous field of entrepreneurs. It therefore makes sense to analyse the potential for support from an innovation perspective. Following Albury (2010) we can identify innovative activity occurring at the stage of **generating possibilities**, often by people working at the bottom of user organisations, and working in networks with researchers and industry; in the stage of **incubation and prototyping**, in public-private research projects that are often under-resourced and with problems of sustainability; in **replication and scaling up**, illustrated by the case studies as in early days, and working though markets, voluntaristic networks (opens-source) and through public institutional channels; and in **analysis and learning**, where individual developers, organisations, and whole communities are building understanding of why and under what circumstances game-based approaches work, through growing evidence of practice. However this is quite new field, and the lessons of many isolated interventions do not yet seem to be systematically incorporated in understanding of good practice and failure.

The challenges to exploiting DGEI identified in the pervious section reflect common barriers in innovation at all these stages, and policy has evolved instruments to address many of them. Following Johansson et al (2007), who identify policy instruments to stimulate innovation, focused on specific actors or structural features, the following features stand out as areas with potential for policy support in the field of DGEI:

1) **Institutions.** Currently the most user organisations are not equipped for DGEI development and use, the 'serious game' industry is identified as rather weak with limited ability to carry though innovation to market phases, and some key institutional partners, particularly intermediaries, such as publishers, professional associations etc are not present, and policy makers are torn between negative and positive images of games and not providing leadership. However there are emerging networked institutions are emerging around public and private funding programmes;

2) **Human capital**, where there are just not enough people with the expertise, and education systems at all levels, including in-work training are not yet delivering appropriate skills that can be available to create DGEI;

3) **Commericalisation** where institutional barriers exist (such as procurement), and networks and markets between developers and potential users have not been built;

4) **R&D**, a key element in DGEI work, not only in research establishments, where both 'basic' and applied game research is conducted, but also in sites of practice where use-side innovation, building practice from existing elements of game culture and technology occurs (Williams et al 2005).

5) **Incentives**, such as R&D subsidy, tax-incentives are a key feature of serious games, and so some degree DGEI, thus probably crucial to maintain in the short term.

6) These elements indicate there is not yet an **innovation system or systems** (Lundvall, 2001; Edquist 2007) that connects users, developers and research sufficiently well, with the necessary formal and informal social learning pathways. The constituencies of interest introduced at the beginning of the report form the nexus of these systems and have a strong base in research, start-ups, and public funding programmes but in general the different application sectors of DGEI are not integrated into these systems.

7) Nonetheless the existing constituencies of research and development provide an emergent **Infrastructure** of

resources, tools and knowledge from which user and producer innovators can draw, and which has potential to be consolidated.

Factors not generally considered challenging for DGEI innovation currently include labour market issues, capital (as yet, though working capital for projects is important) and intellectual property.

This analysis helps us to focus on areas where policy could act: **application domain policies** – which address social inclusion and public service development, and can build a market for game products and services; a **supply-side** approach that supports industrial research and production; a **research approach** that addresses the need for evidence and innovation, and a **skills approach** that supports the human capital needed for all the other approaches.

4.3.4 Application domain policy: education, health and public health, social services etc

DGEI is primarily about the use of digital game-based approaches, rather than the development of supply. The potential of digital games to provide innovative and cost-effective solutions in domains of policy related to social inclusion, and more generally in areas where public governance, funding and delivery dominate depends on policy actions to facilitate use, provide finance, and take down barriers to markets and procurement. Much of this use will be done in public or publicly-funded organisations, with high degree of central control, at least over finance, relatively slow rates of change and limited innovation compared to the private commercial sector (Albury 2005). To develop sustainable practice in application domains, front line intermediaries require assistance and leadership from decision makers and policy, and the addressing of structural and institutional issues that shape their activities. At a European level, it is thus a question of policy attention across DGs such as DG EMPL, DG REGIO, DG SANCO, supporting networks, research, demonstrators and providing policy leadership and support to Member States.

Potential actions include:

1) Public support via **R&D funding for demonstrators and evaluation** to show that digital game approaches are effective and could be cost-effective, and to underpin development of best practice and quality control.

2) Funding for **practitioners to participate in and lead experimental projects,** not only based on adoption of small scale products, but more radical experiments in 'living lab'' situations.

3) **Support to practitioners** and **end-user organisations** to encourage adoption and development of good practice, though networks of practice, institutional support, development of frameworks of use and standards, training, reviews and libraries of games, technical support services, recommended suppliers, and by providing leadership to legitimise use.

4) Putting in place measures (such as guidelines, standards) to ensure **privacy and security and good practice** in sensitive domains.

5) Supporting the industry and public services across Europe to address barriers associated with **procurement and standards.** This could be important in unblocking demand and creating markets in which innovative games developers can get their products and services to those who need them and are willing to pay.

An alternative path to developing the supply of games-based products may also be to **support a 'social' market, open-source platforms and user development,** in situations where it is unlikely that budgets will support commercial business to supply products and services, but where with sufficient support enthusiastic and expert users can drive innovation and use.

4.3.5 Policy opportunities for growth and jobs: stimulating supply

The existing development and potential for growth demands the consideration of a specific policy to support an emerging serious games industry that would have the capacity and interest to innovate and supply services and products to users. The world market is currently estimated at €2.35 billion, with steady growth in very large markets such as education and healthcare. This figure does not include the potential multiplying effects of growth and jobs from the use of the products and services of the industry in other sectors: from improving productivity, innovation etc. Policy could follow, for example, the USA, France, or Finland (where serious games policy is included within a generic game industry policy). Policy should address the issues identified above, as well as providing the more generic support an emerging sector requires. It could be supported, for example, by regional industry specialisation policy focused on particular domains of use, or multi-sector regional centres of excellence across Europe.

Two strategies could be followed:

1. One could be to **support industry development in sectors of high growth** – training for military and corporate markets, or marketing and communication with European and expert potential. This would both strengthen the sector itself, and improve the quality of products available to European firms (e.g. training, marketing).

And/or:

2. The other option is to **support development of the industry supplying sectors such as education, health or policy support,** where the public sector

is the primary client or gatekeeper, and where public intervention could be justified in creating suppliers of products for health, public education uses if a market would not otherwise emerge. There is also an argument to support private business, such as SMEs, to adopt tools that address their training needs when this will help boost growth and jobs.

Types of policy targeting particular issues identified above might include supporting **skills development,** including **identification of skills gaps and needs,** funding for **research, support for SMEs,** facilitation of **technology transfer,** support to development and localisation of **middleware (tools),** development of **standards** and **testing faculties,** infrastructures and standards that **address issues of privacy and security,** international **export support** and **access to capital** as part of programmes on ICT for competitiveness and industry. This would have to be balanced with effective demand-side intervention in these areas as outlined above.

However, the actions aimed at the 'serious' games sector should also been seen in the perspective of support for the entire video games sector, which is currently much larger, and offers considerable scope for growth if provided with the support available in other regions of the world. Many synergies may be found between supporting a diverse industry that operates in several markets with a common skills base and service businesses, and the exploitation of technologies (such as middleware), and platforms, etc. across sectors as demand increases. Without a healthy video games and interactive media industry, and education sector, then serious games and DGEI production will be in a much weaker position.

4.3.6 Research policy

A great many knowledge gaps need addressing, and there are many opportunities for pre-comparative research to explore and develop new techniques that can be taken into products and services. Overall, while no longer in it's infancy, research into the **generic exploitation of games and game techniques** still has a long way to go and needs continued funding on a scientific basis. There is also considerable scope for action to support research on the design of games-based approaches for specific target groups or problems. This must be **multidisciplinary,** bringing together domain experts and game experts. Networks are needed both within domains of application (e.g. public health, education), and across domains, addressing design, pedagogy, behaviour change etc. **The development of tools and technologies** to create games-based products can come from research environments, especially tools that help developers apply 'scientific' principles to game design. Research is also needed to better **understand how and when games-based approaches can be appropriately used,** by understanding better the practices and culture of games use in different communities of users and intermediaries. Research is needed to provide **reliable evaluation of games-based approaches,** both in the laboratory and as the basis of standardised tools and tests for use in practice. Testing and experimental facilities are needed to enable domain-specific research and industry developers to verify and evaluate products and conceptual approaches. These areas of research need to be multi-disciplinary, and funded accordingly.

There is also a need for **research into how best to support innovation and use,** including **analysis of markets, business strategies, skills needs,** and on the **effectiveness and direction of policy interventions** etc.

Finally, research needs to take place in practice, at scale, and over time periods that are sufficient to develop and embed new practices and explore radical new approaches, since games-based methods often do not simply slot into existing practices and institutional structures. It can take several years and multiple cycles of use and reinvention to identify both good and poor practice and identify impacts with sound methodologies.

In terms of addressing the challenges of DGEI, research not only creates new knowledge and techniques that can be turned into good practice and tools to use, but also **produces high profile scientific studies with impact that can change attitudes** and raise awareness of the value of DGEI for professionals and the public.

4.3.7 Skills policy

The development of serious games industry, and use, cannot take place without the the human capital needed to both develop and use games-based approaches effectively. Expansion and improvement in education and training in game development skills is necessary to increase the supply and use of serious games, and their embedding in practice. On the supply side, people with the range of skills to develop digital games and gaming are still in short supply, and mainly found in the commercial video games industry. Ways need to be found to increase supply of skilled people in DGEI, and also to interest those with expertise in the various aspects of game development to apply this to non-entertainment games. A particular focus of skill development should be on people with multi-disciplinary skills needed in the 'scientific' use of game approaches, for example in the pedagogical and motivational aspects of games design, and in skills needed to work in and manage the multi-disciplinary teams necessary to produce effective use of game-based approaches.

A first step could be to **more clearly identify which skills are needed, and which are lacking.** A first step could be to more clearly identify skills that are needed, and are lacking, for example, building on the exercises conducted in France and the UK (Livingstone & Hope,2011; SNJV, 2012), adapted to the requirements of serious game development, and work with industry and education to establish the best ways to develop these.

4.3.8 Serious games and DGEI support policy in the context of general policy to support create and cultural industries, and the videogame industry in particular

Policy also needs to consider the balance between a vision of serious games success and the success and growth of other sectors, for example eLearning, creative and cultural media in general, or, as has been discussed in this document, the video games industry. As suggested above, the overall development of DGEI and 'serious games' in Europe is likely to be strengthened by a strong videogame development industry, creating innovative products and a healthy games ecosystem. As the industry lobby group, EGDF points out, the current and growing world markets for entertainment videogames is an order of magnitude higher than serious games, and a policy to support the games industry that is focused on only the 'serious games' pathway is probably not going to ensure the long-term survival and growth of a leading European games development sector, especially if the European industry as a whole is disadvantaged by policies in third countries.. The choice of policy support should be negotiated with the industry.

However, a successful Europe-based videogame sector does not necessarily mean these firms will invest in and develop non-entertainment markets without policy support. Indeed, by itself, the videogame industry is likely to under-develop the potential of DGEI and serious games: these are small and uncertain markets, which different business environment to mass market entertainment products. A specific policy to stimulate innovation and growth is may be required to develop activities in these sectors that provide new opportunities for growth, but this should not detract from a broader 'serious games' policy focusing on R&D, projects and firms working in the various application sectors, demand-side actions and support for market building and knowledge transfer.

4.3.9 A joined-up approach

The emerging supply industry and R&D actors need to work closely with professionals and policy makers in the application areas relevant to DGEI in order to develop knowledge, networks and eventually markets. A joined-up policy vision could faciliate the emergence of practice that will support the goals of policies for social inclusion, including health and education. Simultaneously action related to research, use and supply is needed to ensure the development of a European industrial strength, use of game-based techniques across sectors, and the employment of professionals in both the supply and application sectors.

4.3.10 A roadmap for DGEI

A final element of the DGEI study was the presentation of the findings of the study to a workshop of representatives of policy, research, practice and industry to help define priority challenges and actions. The full report proposed Roadmap is available as a separate document. This identifies three areas for action:

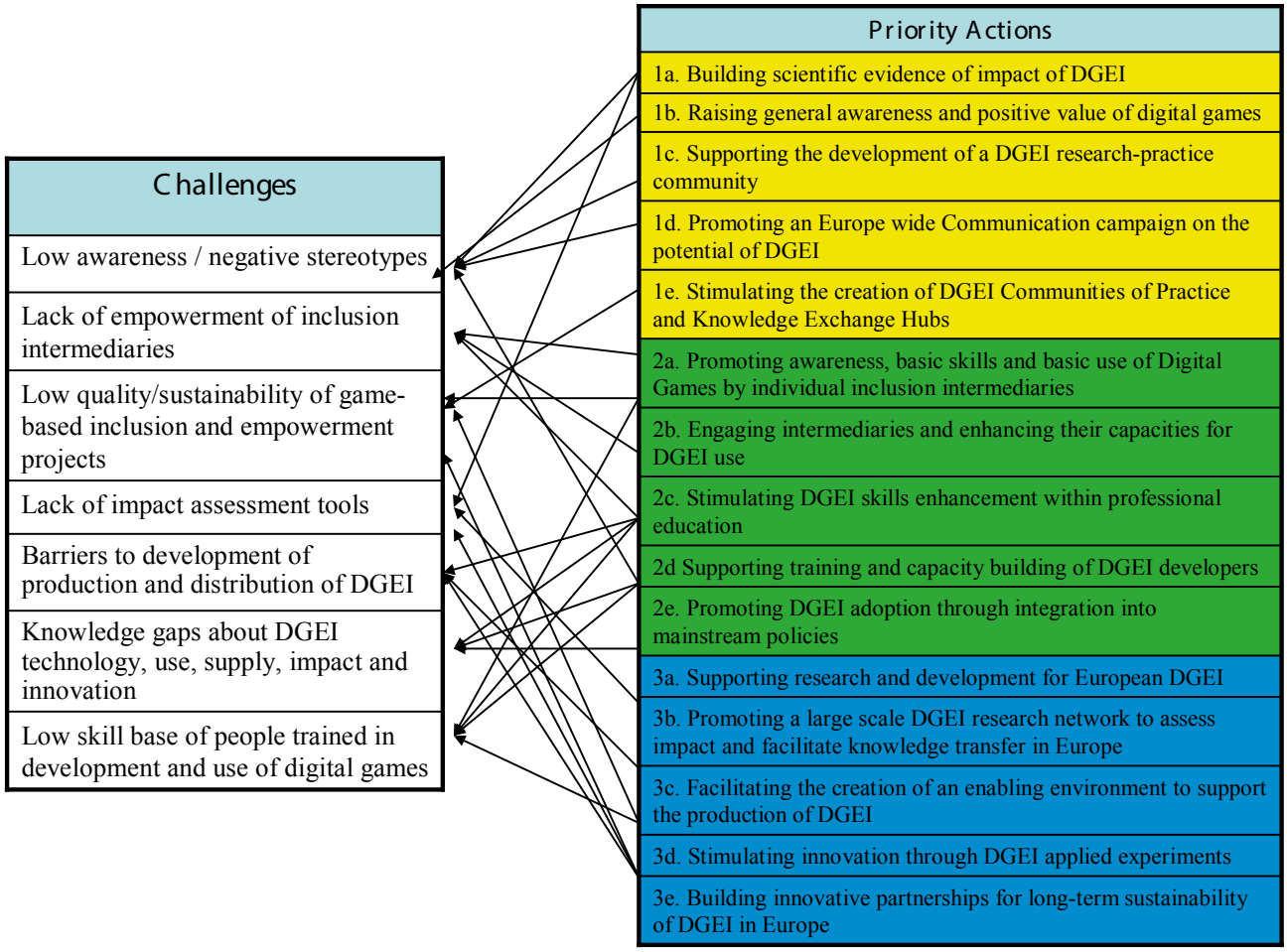
1) Evidence: Demonstrating impact through awareness raising and scientific evidence;

2) Empowerment: Empowering users through enhancing skills and institutional capacities;

3) Innovation: increasing use and impact by bridging research and practice.

Figure 16 shows some of the priority actions, which have been made more concrete in terms of timeframes, stakeholders, and instruments, and how they meet the challenges identified in this report. Details of proposed actions have been included in Annex 3.

Figure 18: Interdependence between DGEI challenges and roadmap priority actions



4.4 Summary and conclusion

We can conclude by stating clearly that the **use of digital games and gaming shows potential in addressing issues of policy concern** including wellness and aging, education and employability of poor learners, improved quality of training and skill development in industry, youth engagement, and civic participation. The development of industry providing services and products is also promising in terms of growth, and in improving the effectiveness of public services and interventions by third sector intermediaries to support social inclusion. In terms of European policy, this could contribute to some of the main goals of Europe 2020: employment opportunities, educational achievement, and reduction of poverty and social exclusion. It is relevant to five of the EC major flagship policies, and a range of other policy areas.

The research literature and case studies explored in this report (Chapter 2) showed that digital games-based approaches provide adaptable, motivating and engaging techniques that can be used to empower individuals and communities in ways that lead to social inclusion. However, this evidence is still fragmentary. A review of practice shows that digital game approaches are being used, and offer particular promise as they can be used to help disengaged and disadvantaged learners and enhancing employability and integration into society, promote health and well-being and Foster civic participation and community-building.

Digital games-based approaches have been found to include the use of commercial entertainment games, special-purpose games, and game-making and the application of game-techniques in non-game contexts, or 'gamification'. These work by facilaiting learning and participation in multiple ways, not merely conveying declarative knowledge, but also developing systems thinking skills, creativity, social skills and other '21st Century' skills such as online collaboration and creative thinking.

Outcomes of these approaches identified in this report include building social ties and participating in communities of practice around gaming; developing core skills such as literacy and maths, and specialised skills in technology and design; personal empowerment though improved self-confidence and self-efficacy; and increasing awareness among particular groups of important issues such as discrimination. All these outcomes offer fundamental support to active empowerment and inclusion, whether it be preparing for employment, keeping active in old age or

enhancing civic participation. Most practice and research focuses on young people, but many other groups are also targeted, ranging from children from deprived communities, to those young people Not in Employment, Education or Training (NEETs), disabled people, the acutely and chronically ill (both mentally and physically), elderly people suffering isolation, or people in communities (with high crime rates or problems of extremism) and social entrepreneurs. Nonetheless, this report finds that today games-based approaches offer a particular opportunity to reach young people at risk – especially the 'NEETs'.

Rather than seeing digital games as replacements for other interventions, or for isolated use, this report focused on their potential for empowering intermediaries and professionals who work in the domain of social inclusion. Digital game approaches can be applied in many areas of social inclusion work, such as combating school and training dropout, coping with chronic illness and enabling migrant integration. When given the appropriate support, professionals such as teachers and medical professionals readily see the potential of digital games. Where internet or mobile access and skills are available, digital games can be distributed at low cost and used online, reaching an unlimited audience. They can be designed to be customisable, bringing benefits of both broad reach and local adaptation. Digital game techniques can be used in formal contexts, like the health services and schools, but may be particularly suited to the context of many social inclusion initiatives promoted by third-sector intermediary organisations, where informal and non-formal learning and support techniques are used.

However social inclusion is a difficult field, so the application of digital games is a complex and sensitive process. The socially excluded often suffer multiple deprivations, and live in communities with many problems and few resources. Interventions with the socially excluded are often poorly resourced and intermediary organisations, professionals and decision makers are under pressure. This makes the adoption of novel approaches like digital gaming difficult and creates barriers to both **effective innovation** involving developers, intermediaries and users, and the emergence of stable practices and markets. Nonetheless, innovation is occurring, and ideas are becoming new practices which can achieve real impact. However, further research and implementation is needed to understand how digital games and gaming can be used effectively and cost-effectively in a range of settings, how to encourage intermediaries to use games, and what role professional games designers can play.

The potential of digital games is in part based on the widespread adoption and use of digital games in 21st century. Digital game audiences are expanding rapidly with new platforms, new mobile devices and new types of games, notably online social games (Chapter 3). The digital games industry, currently worth over €56 billion globally, continues to grow fast, playing a leading role in the development of interactive, mobile and online media products, services and business models, and in the growth of ICT-based consumer business. Investment and innovation in the games industry is also spilling over into other industry segments, making it a driver of growth in more sectors than just the entertainment video games sector.

The use of digital games for social inclusion and empowerment is part of a bigger **trend which has emerged over the last 10 years towards the use of digital game techniques, technologies and products in a range of non-leisure sectors** including health, education, training, defence, communication, advertising and activism. Growth in this market demonstrates the value of digital games for 'serious' purposes. New tools and platforms make games development ever more accessible to both professionals and end users. Moreover, the internet and mobile platforms make distribution cheap and simple – the basis for a growth market. Digital games design offers young people new and attractive education and career paths, not only in games development, but in a whole range of other fields of work. National policy makers, notably in the USA, are focusing on the economic and social opportunities of digital games, promoting the use of digital games in education and government, and raising the visibility and legitimacy of digital gaming. The EC has also invested significantly in R&D and implementation, but without a clear high-level policy vision.

However, despite promising activity across these areas of activity, the idea that digital games can be used as a resource for enabling empowerment and social inclusion is relatively new and not well known. In addition, there are **important barriers and challenges** that stakeholders must address (Chapter 4). The nascent 'serious game industry' is still fragile and ill defined, with shifting business models and poor government support. In fact, it is not yet established whether there is such as thing as a 'serous games' industry at all. While digital games are gaining markets in areas such as advertising and corporate training, it is still unclear what business models and gains in effectiveness and efficiency in other application domains could ensure the development and use of digital games for empowerment and inclusion.

Barriers to adoption among users make the innovation and business development process slow and risky. **Low awareness and negative images** of digital games constitute major barriers to investment and adoption. Changing institutional and professional practice in education, social care and health care to make the best use of ideas, techniques and products of digital gaming often requires slow and uncertain systemic change.

Stimulating this change is further hindered by the **low of quality** of many 'serious games', **lack of formal evidence of impact** and few high-profile demonstrations. Networks and support are only just being put in place to allow the build up of in-depth knowledge and experience among developers, professionals, researchers and educators. Even though there is a great deal of anecdotal evidence, the scientific evaluation and impact assessment literature, although positive, is rather minimal. Considerable work is still needed

to demonstrate convincingly the potential impact of digital games and gaming on social inclusion and empowerment. In addition, appropriate assessment techniques must be found to judge outcomes.

Successful innovation needs investors, users, intermediaries, researchers and game developers who can produce high quality products and services. These must be delivered sustainably and reach a wider constituency of users than just project partners. The mainstream game industry, and game design professionals are still reluctant to work and develop markets in the 'serious' side of digital gaming. Millions of euros and dollars have been spent on research and pilots, but this is not translating into widespread use, and many practitioners have still to be convinced. Funded research projects fail to adequately address issues of implementation and real-life experimentation and sustainability, and are often unable to address the systemic barriers in the application domains. However, this sustainability will not come from individual efforts, but rather from **the development of an ecosystem of production and applied use of digital games in general.**

To build this ecosystem, and to reap the benefits of use of digital games, **the participation of policy is crucial,** partly because social inclusion activities are largely shaped and funded by the state, and partly because necessary coordination needed between research, developing practice and industry is a role in which policy makers have instruments with which they can contribute. The opportunities for public policy have been identified in the areas of jobs and growth, social inclusion and effective provision of public services. To realise these opportunities policy makers need to work together with stakeholders from an enthusiastic community of social entrepreneurs from research, business and practice who are developing the use of digital games for inclusion and empowerment, but face many challenges to realising their vision.

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Annexes

A1. Glossaries

Table 28: Glossary of terms in DGEI	
Term	**Definition**
Assets	Material assets such as housing and thus refer to material goods
Capabilities	Capabilities: Enabling people to increase their well-being by using their assets in different ways
Digital games	Digital games are games produced, distributed and played by means of digital technology. They can be considered as an art and design, technological and research artefact. In the strict sense, a game refers to "a rule-based formal system with a variable and quantifiable outcome, where different outcomes are assigned different values, the player exerts effort in order to influence the outcome, the player feels attached to the outcome, and the consequences of the activity are optional and negotiable." (Juul, 2003). In the report, we use the term digital games to refer to games in the strict sense as well as borderline cases in so far as they are relevant to promoting empowerment and inclusion.
E-inclusion	Entails socio-economic processes shaping access to ICT and related services, awareness of its opportunities and the capability, willingness and confidence to use ICT in every-day life. E-inclusion can refer both to inclusive ICT as well as use of ICT to achieve broader inclusion and empowerment goals. We use the term e-inclusion to refer to (policy-driven) initiatives that attempt to counter social exclusion, promote social inclusion and empower people through digital inclusion.
Empowerment	Empowerment refers to both the community-supported process of (re)gaining control over the resources and decisions that affect one's life, as well as the outcome of this process
Extrinsic motivation	Game play as a means to an end. There are different types of extrinsic motivation that can be situated on a continuum depending on the relative autonomy of the individual. Extrinsic motivation is not necessarily an impoverished form of motivation in which a person only engages in an activity because of external demand. There is also a form that resembles intrinsic motivation, where people choose freely to engage in an activity recognizing its instrumental value.
Formal learning	Learning as an intended and planned activity taking place in an organized context
Game space	"a virtual space in which gamers can join, act and navigate" (Schouten, 2011). Consequently, the ability to connect online in massively multiplayer online role-playing games (MMORPGS) provided an interaction space
Game co-creation	Involving people into a non-trivial component of the design, development, production, marketing and distribution of games

Term	Definition
Games for empowerment and inclusion	1. Special-purpose games (instead of serious games): Games developed for a particular purpose beyond entertainment, in this case, empowerment and inclusion 2. Commercial off-the-shelf games: Games developed for general entertainment, but put to the use of empowerment and inclusion We acknowledge the possibility that meaningful play can emerge from engagement with both types of games. The characteristics of games and their role in participatory culture make them interesting tools for empowerment and inclusion through the learning and participation that they facilitate.
Gamification	Applying game design elements to non-game activities, often with the goal of engaging people more in these activities
Informal learning	Learning without the intention to learn, and without actual planning of learning activities. Sometimes also referred to as experiential or accidental learning
Interaction space	"allowing more meaningful play as gamers are able to communicate, collaborate, decide and co-create" (Schouten, 2011)
Intrinsic motivation	Intrinsic motivation: Game play as a goal in itself; playing the game because one considers it to be an enjoyable, fun activity that is rewarding as such. It is the result of interplay between game characteristics, personal and contextual characteristics. Certain aspects of game play may tend to make this activity interesting for many people, but not necessarily for everyone. It requires that a person's basic needs for competence (i.e. self-efficacy), relatedness and autonomy are satisfied. A person's social context plays an important role in this respect.
Meaningful play	Meaningful play emerges from the interaction between players and a game. It refers to a mutual shaping process, in which the player actively makes sense of the game and this sense-making activity is structured by the game rules, the immediate context in which the game is played and the cultural backdrop.
Non-formal learning	Learning as a result of planned general activities in which participants can learn both intentionally and unintentionally
Persuasive games	Sometimes considered as a sub domain within the broader serious gaming domain, that is, games designed to change attitudes or behaviours of users through persuasion and social influence (Fogg, 2003). Others have used the term persuasive games to refer to games that support the critical interrogation of real-world processes (Bogost, 2007).
Pervasive games	Games that expand beyond traditional temporal, spatial and social conventions of play (see Montola, 2005)
Self-exclusion	Social and/or digital exclusion as a voluntary and conscious strategy
Serious games	"…a mental contest, played with a computer in accordance with specific rules, that uses entertainment to further government or corporate training, education, health, public policy, and strategic communication objectives." (Zyda, 2005, p. 26)
Simulation	A simplified, dynamic, and accurate model of reality (Sauvé et al., 2007)
Social exclusion	Socio-economic processes preventing full participation in society (i.e. production, political, social, consumption and savings activity – Selwyn, 2003) or the outcome of these processes
Social inclusion	Socio-economic processes shaping full participation in society (i.e. production, political, social, consumption and savings activity – Selwyn, 2003) or the outcome of these processes
Virtual world	A synchronous, persistent network of people, represented as avatars, facilitated by networked computers (Bell, 2008)

Table 29: Glossary from the digital game industry	
Hardware platform	The different consoles and handhelds are distinguished, and these are distinguished from the PC, Mac, and now mobile phones, smart phones, tablets and next generation connected televisions
OS platform	For consoles and traditional handhelds, the OS is inseparable form the hardware, but PC/Mac is differentiated, and now mobile OSs such as Android and Apple iOS.
Browser v. Standalone	In PC and mobile gaming, stand alone games are installed as separate applications on the computer or phone, while browser games run directly in the Web browser using standard technologies designed for enabling interactive multimedia, such as Flash, Java. Browser games are usually casual games, and often made available with a free (advertisement funded) or ''freemium' business model (see below) .
Online-offline-browser games	Offline games are played without the need for an internet connection, installed as an application; online games can include both those played with an application or client on the player's device, or through a generic browser, connected to a server or other clients over a network, but will generally refer to the former, and often to Massively Multiplayer Online Games (See below).
Social games	Does not refer to games that are played socially, as many are, but to digital games that are played on and using the capabilities of social network services such as Facebook, GREE etc. Games can be individual use with sharing of scores, badges etc, or truly multi-player with in-game interaction
Mobile games	A term used to refer to games produced for and played on mobile phones and similar platforms, The products and industry are differentiated by having to respond to the particular structure of the mobile telecommunications industry the capabilities of telephones, and the rather closed game distribution systems available in this industry. Occasionally called 'wireless' gaming. Tablet-based gaming fall uncomfortably between PC and mobile gaming in this definition.
Multi-player games; 'social' – social network based; multiplayer; massively multiplayer;	Many digital games, like non-digital games, are designed to be played by several people at the same time. This can be turn taking or simultaneous play. Players can be co-located, using the same or different devices, or play over a network. Network play will generally be facilitated by a game server. In-game interaction will generally be complemented by out-of game interaction, though text chat, voice, video, social media or other communications channel. Massively Multiplayer Online Games (MMOG), with 10s or 100s of thousands of players playing individually or in teams are a major growth and innovation sector of the market, and basics for complex new social and cultural forms of interaction.
eSport	Computer games played as a sport. Amateur and professional gamers play individually or in teams, face to face, or increasingly online. Popular in Korea.
Augmented reality, alternate reality (ARG), and gamification.	Although rather different concepts, these are all areas of gaming that extend into 'real life', where game software and the internet facilitates and supports games and play physical space and 'real life' relationships.

'Gamers', non-gamers and casual gamers.	'Gamers' usually refers to those people who make up the core of the digital game market: they invest time and money in playing games, it is a hobby and even a lifestyle and identity, involving consumer and social activities around games (websites, magazines, competitions, parties etc), and without question gamers are predominantly young men. Non-gamers can either be those who do not play digital games, but these are increasingly rare. Instead it can refer to **casual gamers**, who do not identify themselves as gamers, but will play (with) digital interactive entertainment products. This group of people who now have access to the means to play digital games and game-like products is now recognised as the fastest growing market segment, and the growth of casual games is changing the definition of digital games and gamers.
AAA, Casual and Indie games.	AAA games are the multi-million dollar budget games produced by AAA Studios that can take 2-3 years to develop, and sell in millions of 10s of millions of copies, or count 100s of thousands of online users. They tend to make maximum use of the possibilities of hardware technology of consoles and the PC. AAA games are made in all genres, and generally targeted at 'Gamers'.. Casual games include games for the mass market,, and are generally simple to learn, cheap and can be created for platforms such as the web browser and mobile phone. They work in many genres, but include digital version of puzzles, board games, and card games. However many high value games for consoles including music, dance, fitness games are also termed casual 'Indie games' primarily refers to games produced by independent studios, often with a focus on innovation, creativity and exploration of genres and gameplay.
Serious, Meaningful or Applied Games.	The use of game techniques, genres and technology to design tools and products used specifically for non-leisure ends, such as defence or education. Difficult to produce since it requires integration of expertise in 'serious' application domain with expertise in producing 'good' games. Though hotly debated, there is widespread use of the term serious games and identification of a serious game market and industry**.**
Game Genres	Games are categorized according to form, gameplay and interactivity etc for analysis and marketing. Most popular genres include Strategy, Simulation, such as Sports, Flight, Driving, Construction, Life and Social simulation; Action, including fighting and shooter; Adventure, Role-playing, Music and Dance etc . There are other cross-cutting genres, such as party games, multiplayer games. Educational and 'Serious' games can work in many of these genres as well. Some purists[194] would suggest many of these are not true game genres, but variations on puzzles, competitions etc.
Business model: pay, free, freemium and 'monetisation'	Digital games have traditionally been sold as paid products, and more recently by subscription on online games. Free games characterize much of the casual, browser-based market, often funded by advertising. Freemium is a model common in browser, social and mobile markets, where game-play is initially free, but continued play usual requires purchases, such as in-game credits, virtual goods, extra levels etc. Monetisation is a general term used in free and freemium business for ways to make money from player. In-game adverts and coupons giving game developers a percentage of 'real world' sales is one mechanism.[195]

194 Such as game guru Chris Crawford

195 See for example leading European operator in this field, Sponsorpay, http://www.sponsorpay.com

A2. EU activities in the field of Digital Games and DGEI

A2.1 The European Commission

The Commission been active in the field of Digital Games, primarily through responsive project funding. The majority of activities are funded projects in **DG INFSO/CNECT** (at least 23 in Framework Programmes 7, 6, and 5) and **DG EAC,** though **EACEA** and **the Life Long Learning Programme** (at least 50 projects and studies). **DG COMP** and **DG JUST** have competence related to video games. No evidence has currently been found of explicit activities in other DGs.

A2.1.1 DG CNECT/INFSO

DG INFSO has funded a range of projects, both in technology and in application areas. In terms of cross-project support, currently there is a 'DGEI cluster' of three projects related to Social Inclusion, and the ***GALA (Games and Learning Alliance) NoE*** supported by Technology Enhanced Learning Unit, with 31 partners.[196] DG INFSO supported **Safer Internet programme** has addressed safety in online games since 2005.

While this review of past and existing activities refers to DG INFSO, Digital Games are likely to appear in work plans and funding programmes of DG CNECT Directorate C: Excellence in Science, Directorate G: Media & Data; Directorate H: Sustainable & Secure Society and Directorate E: Net Futures, reflecting past investments both in network and technology, and in application domains, and descriptions of current policy goals.

In June 2012, DG INFSO ran a scoping seminar on Gamification and Education.

The 2011-2012 Work programme explicitly refers to games in:

- Objective ICT-2011.1.5 Networked Media and Search Systems
- End-to-end Immersive and Interactive Media Technologies
- Objective ICT-2011.5.5 ICT for smart and personalised inclusion
- Intelligent and social computing for social interaction, user empowerment and learning or skills acquisition for people at risk of exclusion

And in the draft 2013 work programme:

- Objective ICT-2013.1.6 Connected and Social Media

196 http://www.galanoe.eu/

Commissioner Kroes recognised the value of video games and place in culture in a speech to European Parliament Intellectual Property Forum, European Parliament, 24/01/2012.[197]

A2.1.2 DG EAC and EACEA

Digital Game and gaming related to learning and training have been funded extensively through the **Life Long Learning programme,** in all parts of the programme, stimulated by interest from researchers and practitioners, rather than by explicit specification in calls. These projects are spread across **Comenius, Gruntvig, Leonardo, ICT and Transveral programmes.** There are some projects in **Erasmus.**

Apart from individual community proposed projects, DG EAC funded a policy support project, IMAGINE (Increasing Mainstreaming of Games In Learning Policies[198]) to stimulate the visibility of digital games in education policy (all levels inc. vocational) and a follow-up ENGAGE (European Network for Growing Activity in Game-based learning in Education project).[199] More details are given below. Under the 2011 call a thematic network, SEGAN (Serious Games Network),[200] has been funded to promote a community of practice of 'serious' and learning games users and researchers.

A key resource, funded by the LifeLong Learning programme and provided by European Schoolnet is the LINKED platform[201] which provides evidence and support to both policy makers and practitioners (teachers) on the use of digital games in formal education. It includes detailed papers on research evidence, and short articles, videos and slides on value of digital games, and how they can be used. Unfortunately the promised community platform is not active.

The **MEDIA programme** has funded digital games for a number of years, but this part of a cross media programme where games are secondary to a primary audio-visual production. However this is expected to change in the forthcoming programme.

A2.1.3 DG Comp

DG Competition has been responsible for approving the tax subsidy offered to French video game developers.

A2.1.4 DG JUST

DG JUST has responsibility for consumer protection around the sale of digital game products.

197 http://europa.eu/rapid/pressReleasesAction.do?reference=SPEECH/12/30&format=HTML&aged=1&language=EN&guiLanguage=en

198 http://imaginegames.mdrprojects.com/)

199 http://www.engagelearning.eu/

200 http://www.seriousgamesnet.eu/

201 (http://linked.eun.org/)

A2.1.5 DG EMPL and the European Social Fund

It is difficult to identify projects funded through Social Fund, which is administered at national and regional levels, although two examples have been found in the UK. It is very likely there are other projects in other countries using digital games.

A2.2 European Parliament

The European Parliament published a resolution of 12 March 2009 The protection of consumers, in particular minors, in respect of the use of video games,[202] which highlights the positive value of video games, for learning, skill development, therapy and eInclusion.

A2.3 Summary table

Table 29 lists the projects and other activities obtained by searches of Commission databases, direct input from project and policy officers, and other sources. The search was done using keywords of game, games and play, though other known projects that cover digital games do not mention explicitly in the summaries. Some of the projects that do mention games do not actual have much of a game component. For the Life Long Learning Programme the search was conducted through the EACEA project compendia,[203] CORDIS, and the portals of the LLL programme (e.g. ADAM, EVE, EST). A review of areas where games have been supported or references, a review of areas where there has been no reference would also be enlightening (e.g. in DG ENTR, DG EMPL) where enterprise, training and skills, and application areas of digital games is relevant to policy interests.

A more complete list with details of particular funding line, project description, partners, value etc assembled from various sources is also available on requests.

The majority of the projects mentioned are directly applicable to Empowerment and Social Inclusion. A * indicates DGEI relevance according to a brief review of project description.

202 A6-0051/2009

203 http://eacea.ec.europa.eu/llp/results_projects/project_compendia_en.php

Table 30: Summary of EU activities and interests in digital games	
DG INFSO/CNECT	
The projects are listed according to the Unit of DG INFSO that funded them. They are funded under FP 5, 6 or 7.	
Inclusion, Skills and Youth (New G4) (Previously in DG INFSO Safer Internet Unit)	The Safer Internet Programme has addressed online games since 2005.
eGov (H2)	VOICES project
ICT for Inclusion (H3)	REPLAY Gaming technology platform for social reintegration of marginalised youth *
	MASELTOV Mobile Assistance for Social Inclusion and Empowerment of Immigrants with Persuasive Learning Technologies and Social Network Services *
	TARDIS Training young Adult's Regulation of emotions and Development of social Interaction Skills *
	ASC-INCLUSION Inclusion Integrated Internet-Based Environment for Social Inclusion of Children with Autism Spectrum Conditions (ASC) *
	DGEI Cluster includes the 3 above projects *
	Eldergames - Development of high therapeutic value IST-based games for monitoring and improving the quality of life of elderly people *
TeLearn and Digi-Cult	80Days - Around an inspiring virtual learning world in eighty days
	ELEKTRA - Enhanced Learning Experience and Knowledge Transfer *
	eCIRCUS - Education through Characters with emotional-Intelligence and Role-playing Capabilities that Understand Social interaction *
	GaLA - Game and Learning Alliance (NoE) *
	TERENCE - An Adaptive Learning System for Reasoning about Stories with Poor Comprehenders and their Educators *
	TARGET - Transformative, Adaptive, Responsive and Engaging Environment *
	SIREN - Social games for conflIct REsolution based on natural iNteraction *
	xDELIA – Xcellence in Decision-making through Enhanced Learning in Immersive Applications
ICT for Sustainable Growth	SAVE ENERGY
Broadband service engineering & applications	I3 ESE -Intelligent Information Interfaces for an Experimental School Environment (timeframe 2000 to 2005 in FET unit) *
	PLAYGROUND - videogame empowering users to change the rules of the game FP4-ESPRIT 4*
	CARESS (Creating aesthetically resonant environments in sound) - interactibve music technologies for able and seriously disabled youth FP4-ESPRIT 4 *
	EMMA- Engaging Media for Mental Health Applications immersive media for rehabilitation and presence FP5-IST (2004-2006?) *

Networked Media unit	CITIZEN MEDIA - social media for change, including geocaching games (2006-2009 FP6)
	PLAYMANCER - serious gaming for neuro-rehab and physical rehab *
	GAMES@LARGE - online gaming platforms, ethical aspects included *
	CNG (follow-up of games at large) connected network gaming http://www.cng-project.eu/ Tools to support development and sharing of user generated content
	All PO Loretta ANANIA
OTHER INFSO	IPerG Integrated Project on Pervasive Gaming FP6 *
	GameTools: Advanced tools for developing highly realistic computer games
	ANSWER Artistic-notation-based software engineering for film, animation and computer games
	EDUTAIN@GRID A scalable QoS-enabled business Grid Environment for multi-user real-time online interactive applications

EAC and EACEA and the Life Long Learning Programme	
Mostly, but not all, listed by EACEA http://eacea.ec.europa.eu/llp/results_projects/project_compendia_en.php Projects are listed according to programme, with date of programme first where available, or dates of project following	
Studies	Study On The Impact Of Information And Communications Technology (ICT) And New Media On Language Learning EACEA 2007/09 (2008-2009)
	Indicators of ICT in Primary and Secondary Education final report 2009
Transversal	LINKED - Leveraging Innovation for a Network of Knowledge on Education 2010?
	ENGAGE LEARNING - European Network for Growing Activity in Game-based learning in Education *
	2008-2010 IMAGINE (Increasing Mainstreaming of Games In Learning Policies) *
Leonardo	2011-2013 - GREAT - Game-based Research in Education and Action Training
	2011 Serious Sports
	2010 LABOUR MARKET IN TOUCH: NEW NON-ROUTINE SKILLS VIA MOBILE GAME-BASED LEARNING *
	2010 Labour Market in Touch: new non-routine skills via mobile game-based learning
	2010 Innovating Vocational Educational Training Applying Games Realities Methodology(HU)
	2009 Learn2Lead
	2009 Seize Life through Gaming *
	2008 Game On Extra Time – Serious Educational Games to develop Prevocational Skills in people with Learning Difficulties (UK) *
	2007 Game On Accessible Learning *
	2005 E-sport trainer — New opportunities for youth occupation - pilot strategy for vocational training course in the field of electronic sports *
	2005 Interactive System of Vocational Training

Comenius	2011 LABLearning project *
	2011 StartUp_EU - Be a High Tech Entrepreneur 518060-LLP-1-2011-1-UK-COMENIUS-CMP
	2011 Against Racial Bullying and Xenophobia Project 518614-LLP-1-2011-1-ES-COMENIUS-CMP *
	2010 A Science-Based Tool for Training Fluency in Literacy for Teachers and
	Learners 510127-LLP-1-2010-1-FI-COMENIUS-CMP
	2010 Social Mindedness In Learning communitY 510320-LLP-1-2010-1-IT-COMENIUS-CMP *
	2009 Serious Learning Games 503900-LLP-1-2009-1-PT-COMENIUS-CMP *
	2007 ARGuing for multilingual motivation in web 2.0 *
	2007 Intercultural Education through Museums. *
Grundvig	2011 Successful Intergenerational Learning through Validation, Education & Research *
	2011 Adults' Learning for Intergenerational Creative Experiences *
	2011 TACTICS - Lifelong Games *
	2011 Playing for Interculturality: social games as innovative methodology for training adults key competences *
	2011 Mix@ges - Intergenerational Bonding via Creative New Media *
	2010 LEArning Games for elder Europeans *
	2010 RAGELab Plus - Violence prevention by experimental rage laboratory *
	2010 Train your senses - DYS 2.0 *
	2008 eMULTIPOETRY
	2008 Stimulate European Entrepreneurial Attitudes Game
ICT	2011 MAGICAL MAking Games In CollaborAtion for Learning (2012-2014) *
	2011 Continuing/Higher Education in Research Methods Using Games – CHERMUG *
	2011 SEGAN Serious Games Network * (Thematic Network) http://www.seriousgamesnet.eu/
	2010 simAULA: Tomorrow's Teachers Training *
	EduGameLab *
	2009 Location Based Services - Reconnecting Excluded Communities and Lifelong Learning (RECALL) *
	2009 e-self help - PC learning program "Enhancement of Self Help" *
	2009 PROACTIVE: Fostering Teachers' Creativity through Game-Based Learning *
	2008 Flight Simulator for internet Safety
	2008 E-VITA: European Life Experience *
ERASMUS	Serious Game Design Summer School 2012-2014
Other	There are also a whole range of virtual learning environment projects , some of which could be considered in the domain of serious games (virtual 3D spaces etc)

DG EMPL and the European Social Fund
LearnPlay Foundation (UK) *
Making IT Personal (UK) *

Other DGs	
DG RTD	ALICE RAP (Addictions and lifestyles in contemporary Europe – Reframing addictions project"). This has game based therapy. PO MARCUZZO Cristina (RTD) *
DG JUST	DG JUST Consumer Law with responsibility for consumer production related to digital game sales.
DG COMP	DG Competition have been responsible for approving the tax subsidy offered to French video game developers.

South East Europe Programme (*Part of the European Territorial Cooperation objective of EU Regional Policy (various DGs)*	
	LUDUS - a European network for the transfer of knowledge and dissemination of best practices in the innovative field of Serious Games (May 2009 - April 2012) *

Non-Commission European	
European Parliament	Hosted the final conference of the European Schoolnet of the Digital Games in School project (2009)
	European Parliament resolution of 12 March 2009 The protection of consumers, in particular minors, in respect of the use of video games A6-0051/2009
European Schoolnet (EUN) - A European Network on ICT in School Education	Co-funded the Digital Games in School project
	LINKED - Leveraging Innovation for a Network of Knowledge on Education

A3. A Roadmap for Action on Digital Games for Empowerment and Inclusion in Europe

These tables include the recommendations for stakeholder action developed out of the Stakeholder Workshop, October 2012 (Workshop participants listed in Annex 4)

A3.1 EVIDENCE BUILDING AND AWARENESS RAISING

a. Building scientific evidence of impact of DGEI

WHAT	Support an Europe-wide research to build scientific evidence of the impact of Digital Games in support of users' empowerment and socio-economic inclusion
HOW	Building on existing research, specific studies which demonstrate the impact of Digital Games in support of users' empowerment and socio-economic inclusion should be funded. These would gather evidence and identify good practices in exploiting digital games, and overcoming the barriers to implementation, as well as facilitating replicability and transferability. Positive results would underpin communication to professions, policy and the public on the value of digital games.
WHO	Research community jointly with industry and practitioners, supported by the Commission
WHEN	Short term (2013-2015)

b. Raising general awareness and positive value of digital games

WHAT	Policy leadership to raise the profile of digital games including DGEI, and the digital game industry in the general population and among decision makers
HOW	Work with the industries, and through the media, to promote positive use of digital games, with cultural events around digital games, ministerial presence at industry events, supporting industry and cultural champions (game designers and business leaders and entrepreneurs). Share good practice on how to raise awareness and promote positive images of digital games. Support digital game champions at EU Member State level who will coordinate high profile events, such as festivals, exhibitions, competitions to change the image of games, and raise awareness of the diversity and value, and contribution of games to culture and the economy. High level initiatives, on the model of the US Government that identify and promote the positive use of games and the success of the game industry will provide important leadership throughout the public and private sector.
WHO	Commission, Member States, research community, associations of industry and practitioners
WHEN	Short term (2013-2016)

c. Supporting the development of a DGEI research and practice community

WHAT	Develop an European community of research and practice to exchange knowledge and experiences on the use of DGEI
HOW	Building on the work of existing communities, such as the Network of Excellence supported by the Commission, and associations of industry and practitioners, support the development of an European community aiming at bridging research and practice and contributing to both making available evidence of impacts of the application of DGEI and raise awareness of the potential of DGEI to policy makers and society at large. This could include for instance the supporting of more 'prizes' for best DGEI applications and the organization of 'DGEI Apps development contests' among other activities. The community could be initially supported with funding from the Commission but in the medium term its self-sustainability should be ensured.
WHO	Research community jointly with industry and practitioners, supported by the Commission
WHEN	Short term (2013-2016)

d. Promoting an Europe wide communication campaign on the potential of DGEI

WHAT	Support the organization of an Europe wide campaign to communicate the potential of DGEI specifically
HOW	The Commission jointly with Member States and with the support of the European community of research and practice (established according to action 1c) should promote the organization of an of a Europe wide campaign to communicate the potential of DGEI. This campaign may be structured around the proposal of having an 'European Year of Digital Games' and organize online and offline events throughout the duration of the selected European year. A key element in setting up and running the campaign will be the role of champions and leaders within sectors and at EU Member State level to raise awareness and promote good practice, following the model of 'Digital Champions' in e-inclusion policy. The existing Digital Champions can also be supported to promote the use of DGEI in eInclusion contexts.
WHO	Commission, Member States, research community, associations of industry and practitioners
WHEN	Medium-Term (2016-2020)

e. Stimulating the creation of DGEI communities of practice and knowledge exchange hubs

WHAT	Support the establishment of Communities of Practice and Knowledge Exchange Hubs to link all interested actors to contribute in a cross/fertilization ecosystem.
HOW	Supporting the creation of communities of digital game *use* as an alternative to the promotion of isolated game products is a crucial issue to be addressed. This will include sector-specific communities, focused on users, such as teachers and youth workers, and cross-sector and multi-disciplinary partnerships. These will not only focus the use and development of special purpose games, but also on game-making approaches and gamification of the educational and social settings. Funding schemes and actions must be able to embrace processes. These communities will be supported through funded projects to develop evaluation tools, exchange good practice. The communities will propose high profile demonstration projects in each sector that could be supported by the Commission, through funding 'pilot projects' and especially by Member States and industry with more dedicated funding programs. However, business models for sustaining in the long term such communities and the ecosystem within which they are placed should be defined so to ensure their long term sustainability.
WHO	Commission, Member States, research community, associations of industry and practitioners, intermediary organisations and sector professionals
WHEN	Medium-Term (2016-2020)

A3.2 EMPOWERMENT, SKILLING AND INSTITUTIONAL CAPACITY BUILDING

a. Promoting awareness basic skills and basic use of digital games

WHAT	Promote and support the use of Digital Games by inclusion intermediaries
HOW	Inclusion Intermediaries should inspired to break the resistance towards digital games to appreciate the empowerment potentials for their target groups, and understand how they can start to use game-based approaches themselves. The Commission could support Member States to develop low-cost local and national demonstration and training sites to promote the use and creation of games in the target sectors. These sites will sites to demonstrate existing practice, provide basic training, and lend equipment and games. To support this, studies can more clearly identify the needs and concerns of user communities, as has been done for teachers, but which needs extended to other user groups. The Commission could support European networking on good practice in running these sites and the studies.
WHO	Commission, Member States, local and regional authorities, schools and educational institutions, research community, associations of industry and practitioners, intermediary organisations and sector professionals
WHEN	Short term (2013-2015)

b. Engaging intermediaries and enhancing their capacities for DGEI use

WHAT	Extend the use of DGEI by intermediaries and support capacity building activities
HOW	Building on 2a, capacity building activities should address how inclusion intermediaries can include gaming and gamification more systematically in their practice. Local and regional authorities should development, promote and facilitate 'real-world training programs' for continuing professional development, with participation of game developers, educational and social staff and researchers, not only on the use of off the shelf games, but more systematically on how to best select approaches according to needs and target groups, and reshape programmes around possibilities offered by games and other social media. This will require preparation of training courses, support material, of education and research establishments, supported nationally and at a European level. These will also require the development of more systematic support services, and the opening up of relationships with suppliers of services and products, taking down bureaucratic and commercial barriers, though changes in procurement and licencing procedures that act as barriers to DGEI, and establishing new commercial relationships.
WHO	Member States, local and regional authorities, schools and educational institutions, research community, associations of industry and practitioners, intermediary organisations and sector professionals, job placement agencies
WHEN	Medium-Term (2016-2020)

c. Stimulating DGEI skills enhancement within professional education

WHAT	Promote the enhancement of skills for DGEI in view of future professions
HOW	Training in appropriate use of game-based approaches should be incorporated into the initial training of new professionals working in areas where empowerment is important. (e.g. teachers, social workers, health staff, youth workers, community workers, etc.). This requires modules to be developed and training provided to educators, based on existing good practice. Indeed game-based approaches can be used in these educational programmes themselves. Educational programmes can be developed for new specialised job profiles supporting game use in practice, such as game designers working in educational institutions, and specialist trainers and developers of game-based approaches. Studies can more clearly identify these profiles.
WHO	Member States, local and regional authorities, schools and educational institutions, research community, associations of industry and practitioners, intermediary organisations and sector professionals, job placement agencies
WHEN	Medium-Term (2016-2020)

d. Supporting training and capacity building of DGEI developers

WHAT	Support the training of game developers and intermediaries so to unleash the future market potential and social benefits of DGEI
HOW	Training for game developers is required, to ensure supply to the interactive media sector that will produce digital game products and services to emerging markets in special purpose games. This capacity can be developed through tertiary education. New and existing game developers and project managers also require education in complementary skills to work in teams the developing special purpose games and game-based practices for Empowerment and inclusion, an to run business supplying game products and services to user sectors. These skills often have to be developed in practice. Therefore, support measures to promote action-learning and multi-disciplinary training should be funded. Actions may also be needed to support investment in tools and equipment on the part of developers, where this equipment is necessary to produce products and services appropriate to emerging DGEI markets.
WHO	Member States, local and regional authorities, schools and educational institutions, research community, associations of industry and practitioners, intermediary organisations and sector professionals, job placement agencies.
WHEN	Short term (2013-2016)

e. Promoting DGEI adoption through integration into mainstream policies

WHAT	Integrate support measures for the adoption of DGEI into mainstream policies at EU and national level
HOW	The Commission could propose to integrate DGEI as a specific action line in the Europe 2020 strategy linking it to the different polices addressing social inclusion and empowerment (e.g. Digital Agenda, New Skills for New Jobs; Youth on the Move; Social Inclusion and Employment Packages, etc.). Specific existing or foreseen funding measures should continue to supporting DGEI, including training and exchange schemes (e.g. Erasmus for All, European Social Fund); Research (Horizon 2020); deployment (Media and Culture programs; Active Citizens, Learning Communities and Inclusion programs; INTERREG; European Social Fund). In particular, it might be very valuable to consider introducing DGEI in the European Social Fund to allow more large-scale evidence on the impact of gaming for unemployed and other disadvantaged groups. Funding measures should take a holistic approach to DGEI, allowing empowerment (use) and game production activities within the same funding schemes. In addition to Commission funded measures, Member States through the planning of European Structural Funds and national and local funding programmes, should consider introducing DGEI as a specific focus of attention.
WHO	Commission, Member States, research community, associations of industry and practitioners
WHEN	Medium to Long Term (2016-)

A3.3 UNLEASHING THE INNOVATION POTENTIAL OF DGEI

a. Supporting research and development for European DGEI

WHAT	Innovative funding of Research and Development for DGEI in Europe
HOW	Stakeholders agree that DGEI is at a stage where research has a fundamental role to play producing new ideas, formalising knowledge and supporting use. Research needs a boost at European level and in global networks. However, traditional funding schemes for research may not be sufficient and innovative funding mechanisms are required. Support measures should include both funding on basic research on valid assessment of empowerment and inclusion processes enabled by DGEI; basic and applied research on ways to use game based approaches to tackle particular issues; research on game playing culture of target users and inclusion intermediaries; and cross cutting research on creating quality games at lower costs, including specialised development tools., including game design tools for non-professionals, methods for exploiting ethically data produced though DGEI use, and integration of games with delivery platforms suitable for DGEI uses. For this purpose, in addition to direct funding through EC funded programmes, the Commission should invite Member States to frame 'action research' activities in collaboration with research bodies, in which research is integrated in Digital Games practices at all levels, and especially in the specific target sectors relevant for empowerment and inclusion. Member States should also promote the establishment of small local as well as high-level national DGEI consortia, embracing policy-makers, game industry associations, intermediary institutions and end-users so to facilitate research participation in European communities of gaming.
WHO	Commission, Member States, research community, associations of industry and practitioners, intermediary organisations and sector professionals, local and regional authorities
WHEN	Short term (2013-2015)

b. Promoting large scale DGEI research networks to assess impact and facilitate knowledge transfer in Europe

WHAT	Support large scale action research to assess the impact of Digital Game-based inclusion and empowerment processes in detail within long-term research schemes through developing indicators and assessment approaches able to embrace the potential impact of DGEI
HOW	Support a few 'large scale pilots' for action research, joining a rich diversity of Digital Games communities from research and practices, and relevant stakeholders. This should include designing the research structures and parameters along the processes and conduct research targeted at exploring, for instance: the empowerment and inclusion potential of commercial games; the learning potential of leisure game playing, and the different empowerment and inclusion results deriving from playing and developing games. These programmes should produce study results that have high impact outside research. This action research should be carried out by a large network of partners involving multi-disciplinary teams and being directly linked to the practice community and policy makers so to maximize its outreach and impact. An important component of this large scale pilot should be the capacity to codify knowledge and insights so to facilitate the transfer of knowledge across sectors and across Europe.
WHO	Commission, Member States, research community, associations of industry and practitioners, intermediary organisations and sector professionals, local and regional authorities
WHEN	Medium-Term (2016-2020)

c. Facilitating the creation of an enabling environment to support the production of DGEI

WHAT	The existing development and potential for growth of DGEI demands the consideration of specific policy measures to support the emerging DGEI industries, both focuses on individual use sectors, and in cross-cutting services and technologies. This support, following the examples of the USA, Finland or France should include stimulating directly and indirectly regional industry specialization programmes focused on particular domains of use, the development of multi-sector regional centres of excellence across Europe and linkage with global markets and actors.
HOW	Member States should put DGEI and gamification in general high on national agendas and could provide direct and indirect financial support for the Digital Games industry, taking into account the differences between entertainment and special purpose games business models. This should include funding the creation of DGEI eco-systems, for example at regional level; support cross-sector partnerships at local, regional and national level and promoting the link between research institutes, SMEs and users. At European level the European Commission might wish to support the creation of a diversity of DGEI eco-systems across Europe. Regional ecosystems can balanced against the establishment of powerful European research centres with expertise in special purpose games, in which research, game enterprises and user organizations partner up. The objective would be to boost the creation of a rich fund of DGEI eco-systems and gamification aiming to change user mentality in the educational, social and health sectors, as well as among public authorities. Some of this work should focus on the tools and platforms needed to ensure that DGEI is compliant with privacy and special needs of many DGEI environments, and on identifying, and creating,, if necessary, open consortia standards for open source and commercial development A special emphasis should be put on analysing issues related to procurement and standards so to facilitate knowledge creation and exchange, and developing innovative business models, and working with key market intermediaries to establish effective business models for the supply of DGEI products and service, particular to public services.
WHO	Commission, Member States, research community, associations of industry and practitioners, intermediary organisations and sector professionals, local and regional authorities.
WHEN	Medium-Term (2016-2020)

d. Stimulating innovation through DGEI applied experiments

WHAT	Promote the flourishing of real life experiments of innovative Digital Game-based approaches
HOW	DGEI needs many more examples of use in practice. While commercial and research entrepreneurs are producing some examples, there needs to be a flourishing of real life experiments across Europe, by inclusion intermediaries, end users, and student innovators. This includes games for individuals, but also collective gaming and gamification – focused on communities of participants in physical locations. We are short of such practices and examples. Such initiatives might evidence very powerful social and learning outcomes, including intergenerational knowledge transfer. However such experiments carried out with real users in real settings, and often carried out with minimal financing and expertise, need access to support to understand how successes were achieved, and the actual outcomes and impacts, if they are to be developed further. This can be provided through regional and global Living Lab facilities. Such experiments involving diverse communities should link up with the increasing interest in developing learning communities and Smartcities, to develop local support infrastructures that enable user-creation of games and gamification projects. This also means that funding measures should include linking projects (such as social, health, environmental, etc.) to the establishing of social networks around the gaming activities and existing funding instruments and mainstream policy support programmes.
WHO	Commission, Member States, research community, associations of industry and practitioners, intermediary organisations and sector professionals, local and regional authorities
WHEN	Medium-Term (2016-2020)

e. Building innovative partnerships for long-term sustainability of DGEI in Europe

WHAT	Promoting the creation of an European Innovation Partnership on DGEI
HOW	Stakeholders agree that the emerging DGEI industries need support to gain foothold in emerging markets in Europe and globally. However, traditional support might not be feasible for generating growth of this industry as its growth potential is closely linked to new business models in which a myriad of developer SMEs are expected to partner up with a diversity of user organizations and users, and market intermediaries that ensure distribution and sustainability. Whereas national support might address direct or indirect financial support, for example including the establishment of incubators, European support might be linked to the creation of multi-disciplinary partnerships, partnering up with sectoral stakeholders and producing a rich diversity of "role-model" for Digital Games and gamification, thus helping boost the overall eco-system of Digital Games across Europe. This should involve the integration of funding measures for supporting Digital Games communities into already existing or planned programs (e.g. Horizon 2020 and the European Structural Funds), instead of isolating actions in separate "box-programs". On the other side, however, a specific program addressing DGEI priorities directly should be established. This could include for example the proposal for a European Innovation Partnership (EIP) on DGEI.
WHO	Commission, Member States, research community, associations of industry and practitioners, intermediary organisations and sector professionals, local and regional authorities
WHEN	Medium to Long Term (2016-)

Table 31: A Blueprint for a DGEI Roadmap for Action

Action	Timeframe							
1a. Building scientific evidence of impact of DGEI								
1b. Raising general awareness and positive value of digital games								
1c. Supporting the development of a DGEI research-practice community								
1d. Promoting an Europe wide Communication campaign on the potential of DGEI								
1e. Stimulating the creation of DGEI Communities of Practice and Knowledge Exchange Hubs								
2a. Promoting awareness basic skills and basic use of Digital Games								
2b. Engaging intermediaries and enhancing their capacities for DGEI use								
2c. Stimulating DGEI skills enhancement within professional education								
2d Supporting training and capacity building of DGEI developers								
2e. Promoting DGEI adoption through integration into mainstream policies								
3a. Supporting research and development for European DGEI								
3b. Promoting a large scale DGEI research network								
3c. Facilitating the creation of an enabling environment to support the production of DGEI								
3d. Stimulating innovation through DGEI applied experiments								
3e. Building innovative partnerships for long-term sustainability of DGEI in Europe								
	2013	2014	2015	2016	2017	2018	2019	2020

Key

Strategic Focus Area 1: EVIDENCE

Strategic Focus Area 2: EMPOWERMENT

Strategic Focus Area 3: INNOVATION

EC Policy Decisions

Implementation period by all stakeholders

A4. Workshop Participants

A4.1 Expert Workshop "Digital Games for Empowerment and Inclusion"

Participants in the expert workshop in Sevilla, 23-24 January 2012.

More details and presentations can be found on the IPTS website

Ilona Buchem, Beuth University of Applied Sciences, Berlin, Germany

Anton Civit, Universidad de Sevilla, Seville, Spain

Scott Colfer, Media for Development, UK

Alessandro De Gloria, University of Genoa, Genoa, Italy (GALA Network of Excellence)

Flavio Escribano, ArsGames, Seville, Spain

Olivier Glassey, University of Lausanne, Switzerland

Celia Gómez González, Consejería de Salud-Junta de Andalucía, Seville, Spain

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Jean Menu, Universciences, Paris, France

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Gianluca Misuraca, JRC, IPTS, Spain

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James Stewart, JRC, IPTS, Spain

A4.2 Policy-makers Workshop "Building an EC Inter-service Consensus on Opportunities, Challenges and Possible Actions on Digital Games for Empowerment and Inclusion (DGEI)"

Participants in the Policy-makers' workshop in Brussels on 24 September 2012

Marco Marsella, DG CNECT G4 Inclusion, Skills and Youth

Clara Centeno, JRC IPTS IS Unit

James Stewart, JRC IPTS IS Unit

Lieve van den Brande, DG EAC A2 Skills and Qualifications

Graeme Robertson, DG EAC E1, Youth Policy

Sergej Koperdak, DG EAC E1, Youth Policy

Ralph Dum, DG CNECT.C3 Digital Science

Kirsti Ala-Mutka, DG CNECT.C3 Digital Science

Eamon O'Reilly, EACEA

Anne Degrand-Guillaud, DG EMPL D1 Social Protection Social Inclusion Strategy

Srd. Kisevic, CoE Youth Partnership

Cristina Marcuzzo, DG RTD DDG2 B5 SSH Youth

André Richier, DG ENTR D3 ICT for Competitiveness and Industrial Innovation

INVITED EXPERTS

Derek Robertson, Scottish Executive, UK

Jean Menu, Président de l'association Serious Game Lab, FR

Jan Van Looy, IBBT-MICT-University of Gent, BE

A4.3 Stakeholders' Workshop: "Building a Roadmap for Future Actions supporting Digital Games for Empowerment and Inclusion (DGEI)"

Participants in the Stakeholders' Workshop, Brussels, DG CNECT.

Jan Gejel, Aarhus College, DK

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Title: The Potential of Digital Games for Empowerment and Social Inclusion of Groups at Risk of Social and Economic Exclusion: Evidence and Opportunity for Policy

Authors: James Stewart, Lizzy Bleumers, Jan Van Looy, Ilse Mariën, Anissa All, Dana Schurmans, Koen Willaert, Frederik De Grove, An Jacobs, Gianluca Misuraca

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Abstract
This report addresses the potential of digital games to support social inclusion and empowerment (DGEI). It is based on a range of theoretical and empirical data, brought together for the first time in this and associated reports. The aim of the report, commissioned by DG CNECT, is to provide a better understanding of the industrial, market, social opportunities and limitations of digital games for empowerment and as a tool for socio-economic inclusion of people at risk of exclusion (such as youth at risk, migrants, elderly people, the unemployed, and the low-educated). A review of the literature, 12 original short case studies, workshops, and contributions from experts and stakeholders were used to identify both opportunities and challenges for deployment of digital games and gaming in fields such as wellness and aging, education and employability of poor learners, improved quality of training and skill development in industry, and civic participation. It concludes that there is sufficient evidence and activity to foresee positive impacts in terms of social inclusion, public service improvement, and employment and growth, but significant activity is still required in research, innovation, and especially in practice, before clear conclusions on large scale impact could be drawn. The report finishes by suggesting a range of actions related to the video game and 'serious game and gamification'' industry, research, skills, and application sectors that could be taken by stakeholders and policy makers in order to exploit the opportunities of DGEI.

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